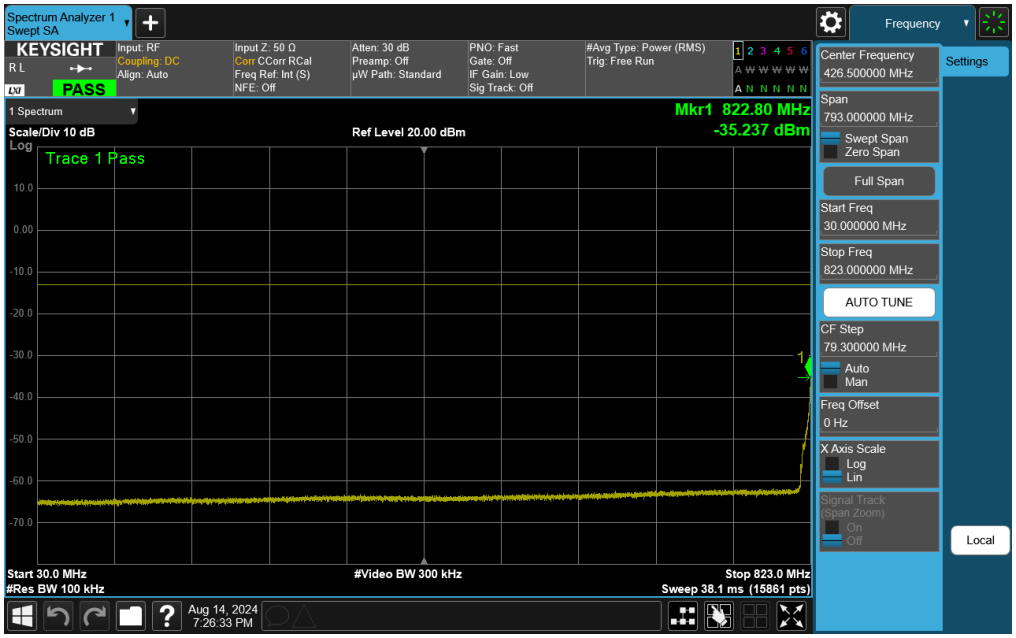
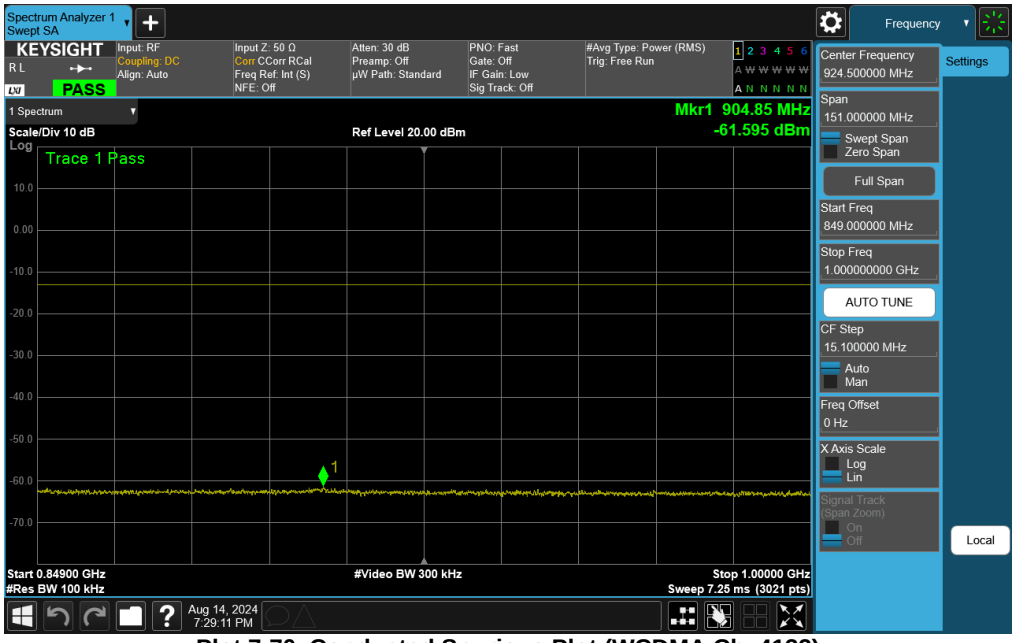
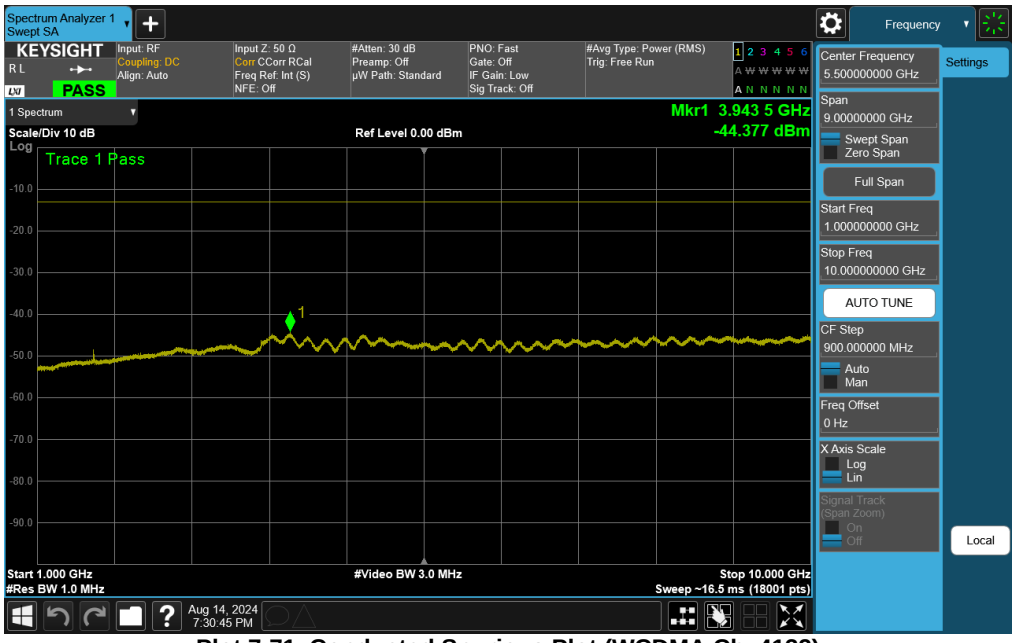
WCDMA Cell



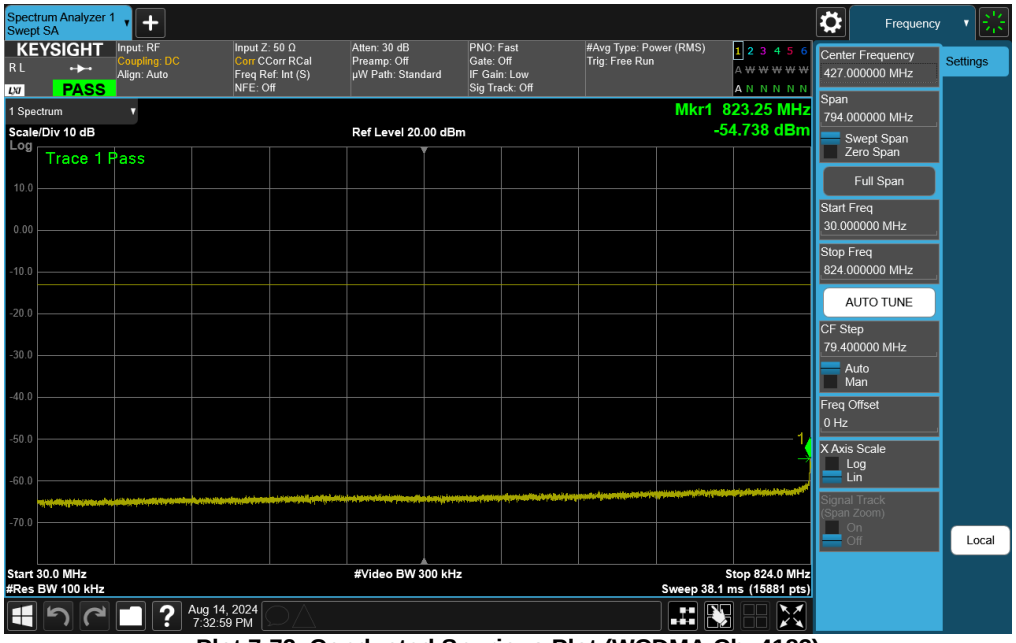
Plot 7-69. Conducted Spurious Plot (WCDMA Ch. 4132)



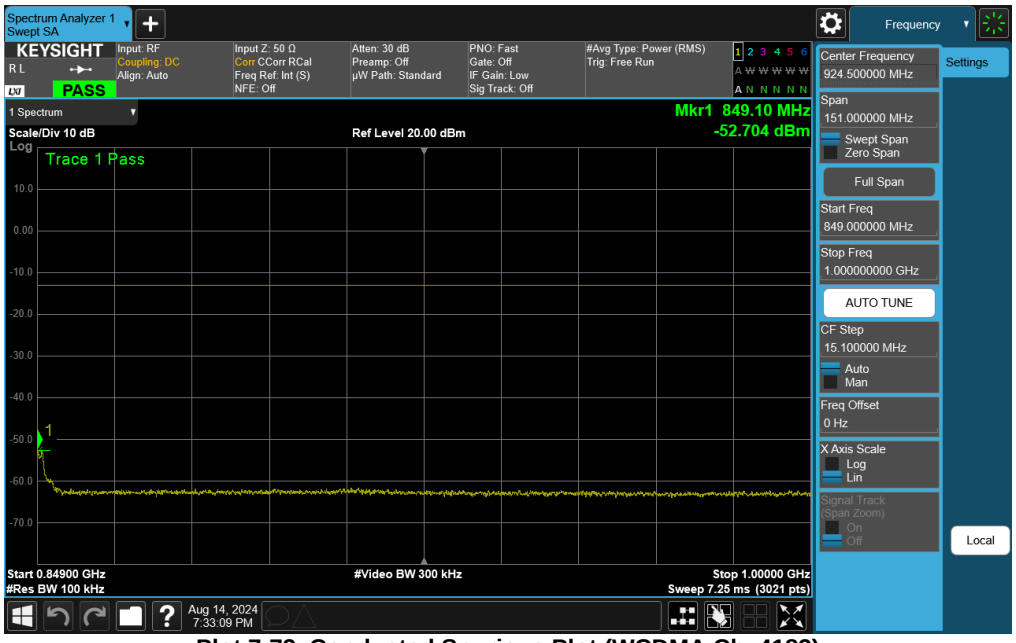
Plot 7-70. Conducted Spurious Plot (WCDMA Ch. 4132)



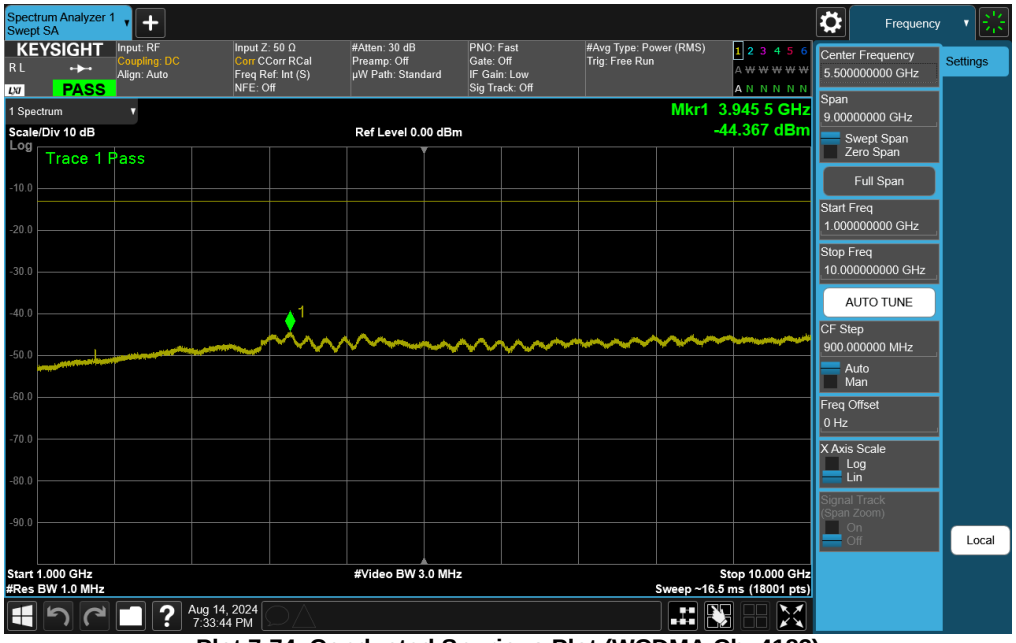
Plot 7-71. Conducted Spurious Plot (WCDMA Ch. 4132)



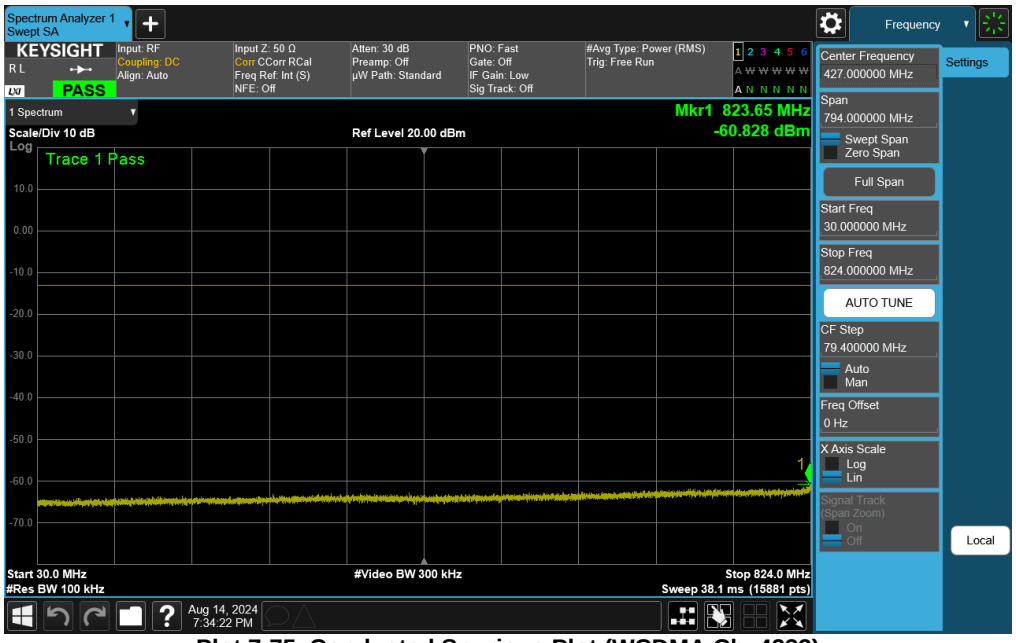
Plot 7-72. Conducted Spurious Plot (WCDMA Ch. 4183)



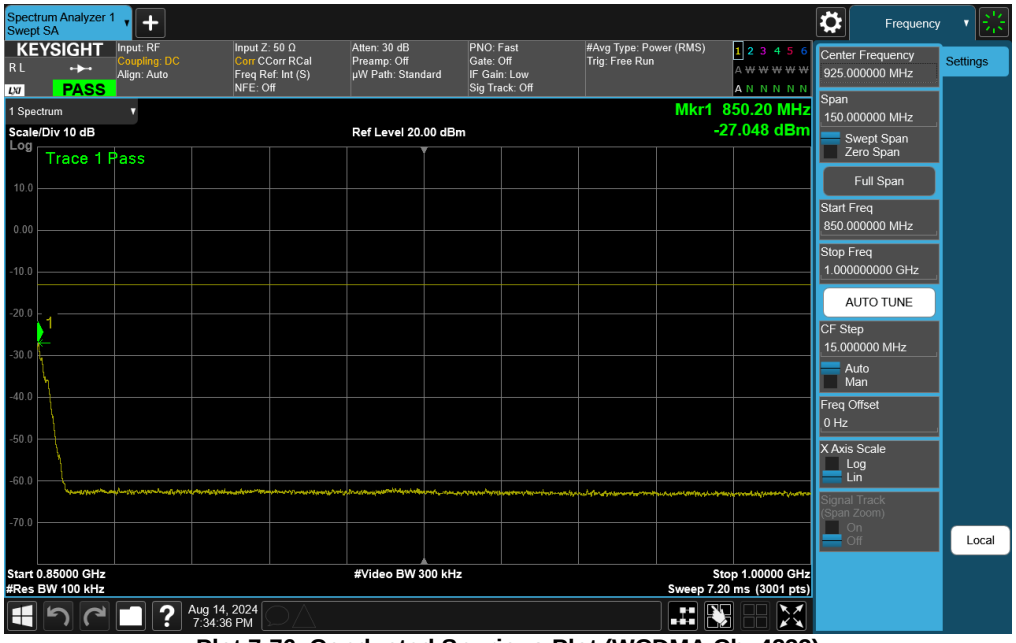
Plot 7-73. Conducted Spurious Plot (WCDMA Ch. 4183)



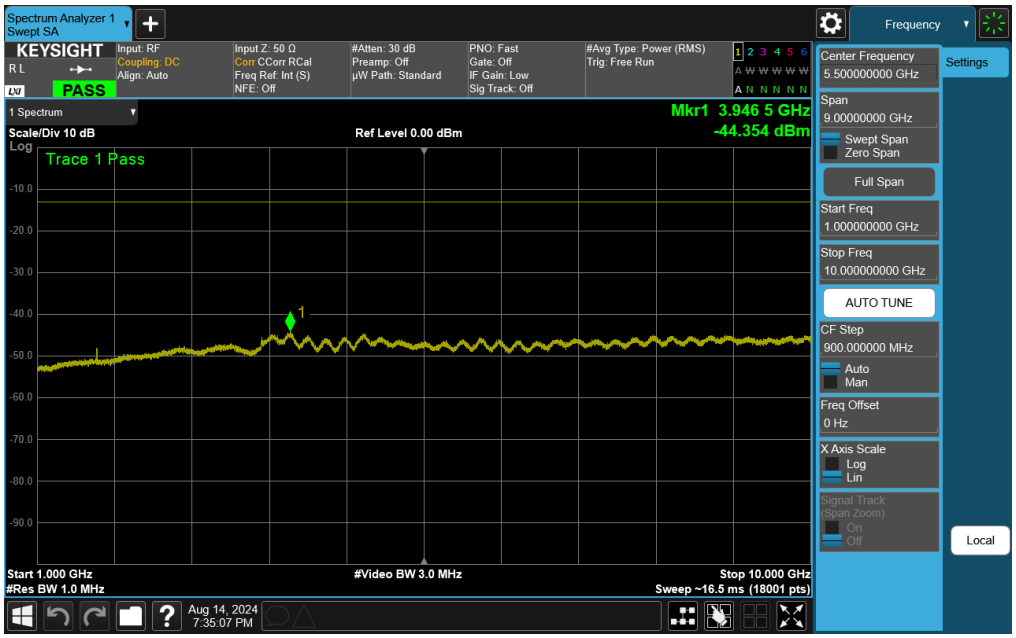
Plot 7-74. Conducted Spurious Plot (WCDMA Ch. 4183)



Plot 7-75. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-76. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-77. Conducted Spurious Plot (WCDMA Ch. 4233)

7.4 Band Edge Emissions at Antenna Terminal

§2.1051, 22.917(a)

Test Overview and limit

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section. All ports were tested and only the worst case data was reported.

The minimum permissible attenuation level of any spurious emission is 43 + 10 $log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

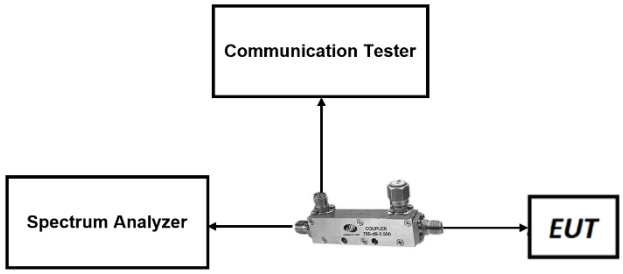


Figure 7-5. LTE Test Instrument & Measurement Setup

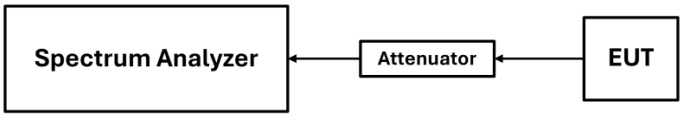


Figure 7-6. FR1 Test Instrument & Measurement Setup

Test Notes

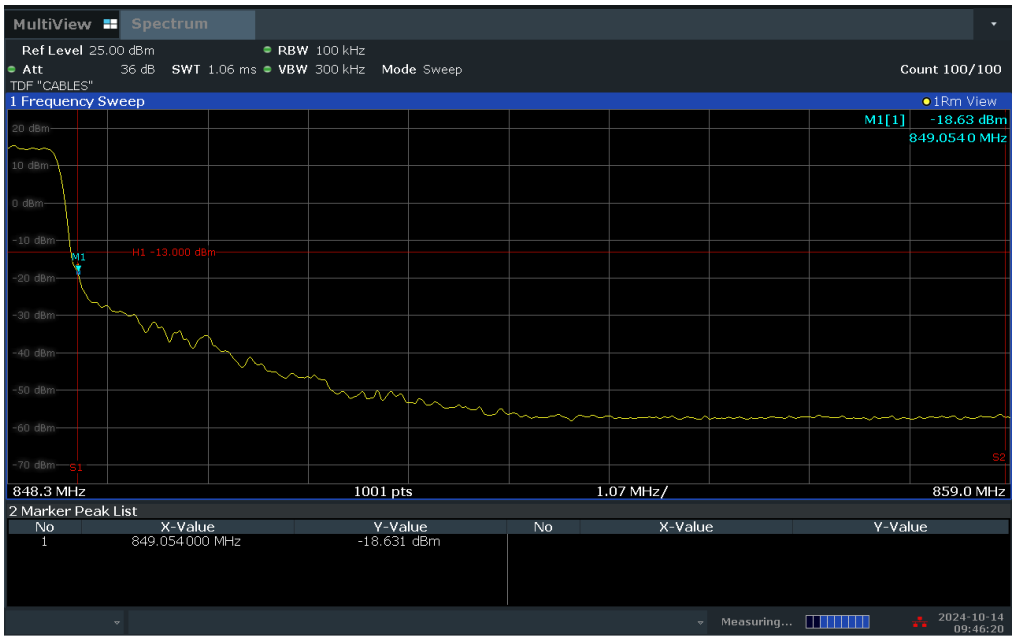
1. Per 22.917(b), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 26

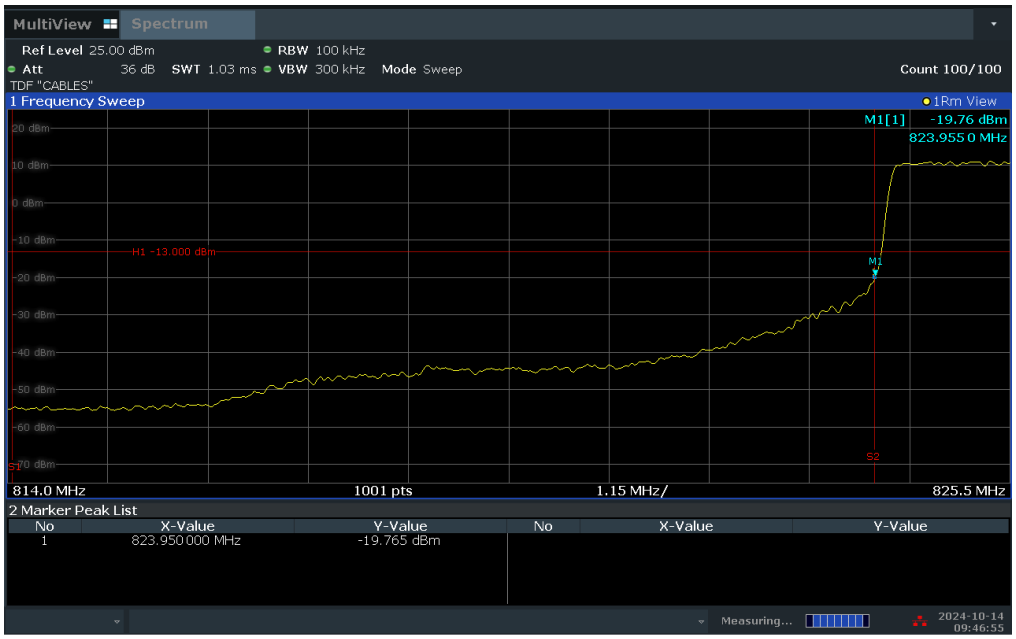
09:45:16 AM 10/14/2024

Plot 7-78. Lower BE Plot (LTE Band 26 – 1.4MHz QPSK – Full RB Configuration)



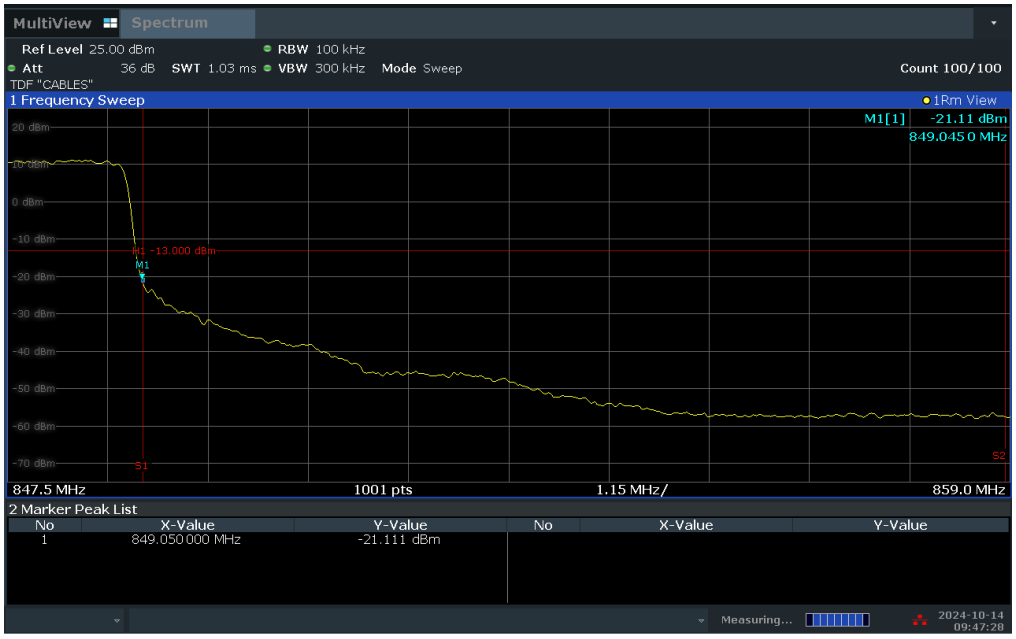
09:46:20 AM 10/14/2024

Plot 7-79. Upper BE Plot (LTE Band 26 – 1.4MHz QPSK – Full RB Configuration)



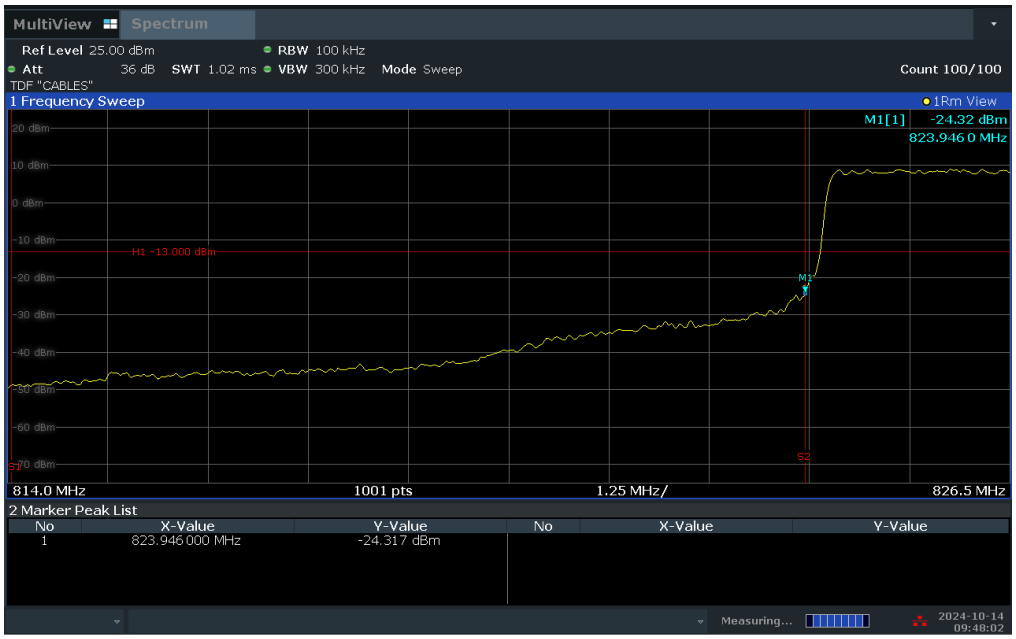
09:46:55 AM 10/14/2024

Plot 7-80. Lower BE Plot (LTE Band 26 - 3MHz QPSK – Full RB Configuration)



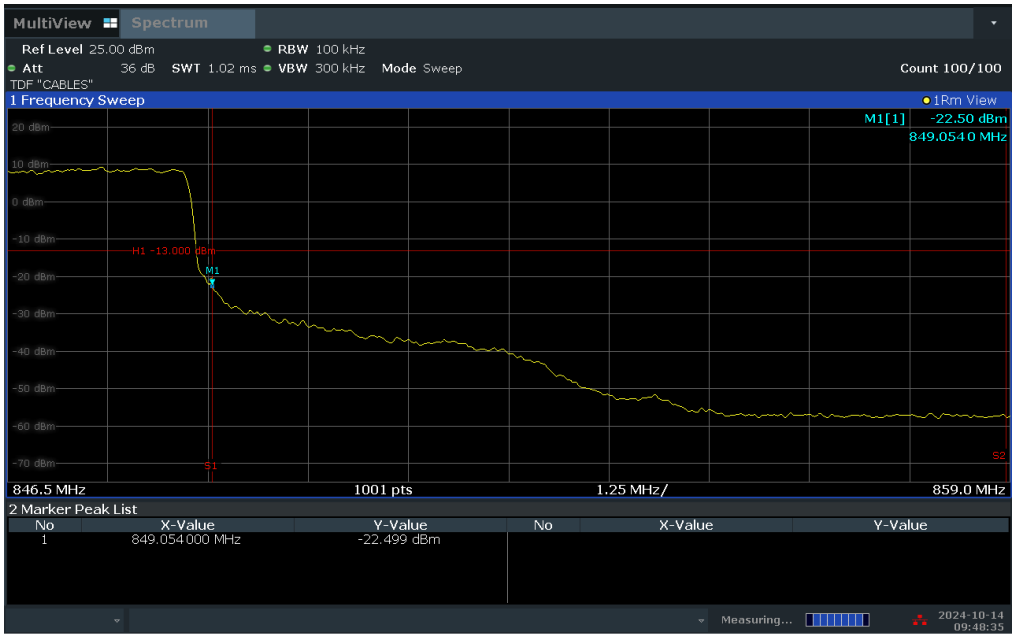
09:47:28 AM 10/14/2024

Plot 7-81. Upper BE Plot (LTE Band 26 - 3MHz QPSK – Full RB Configuration)



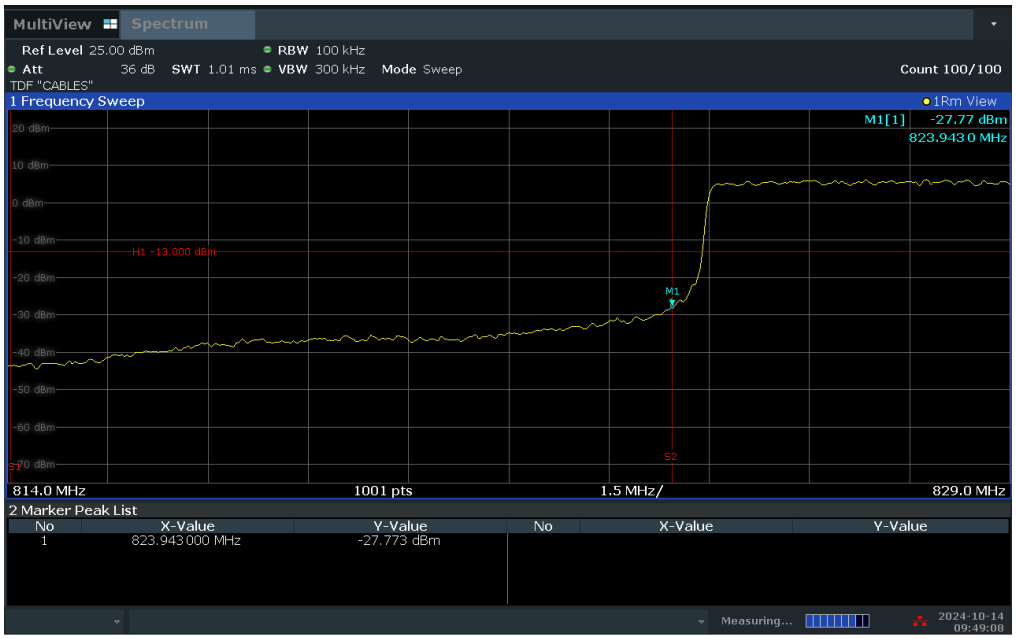
09:48:02 AM 10/14/2024

Plot 7-82. Lower BE Plot (LTE Band 26 - 5MHz QPSK – Full RB Configuration)



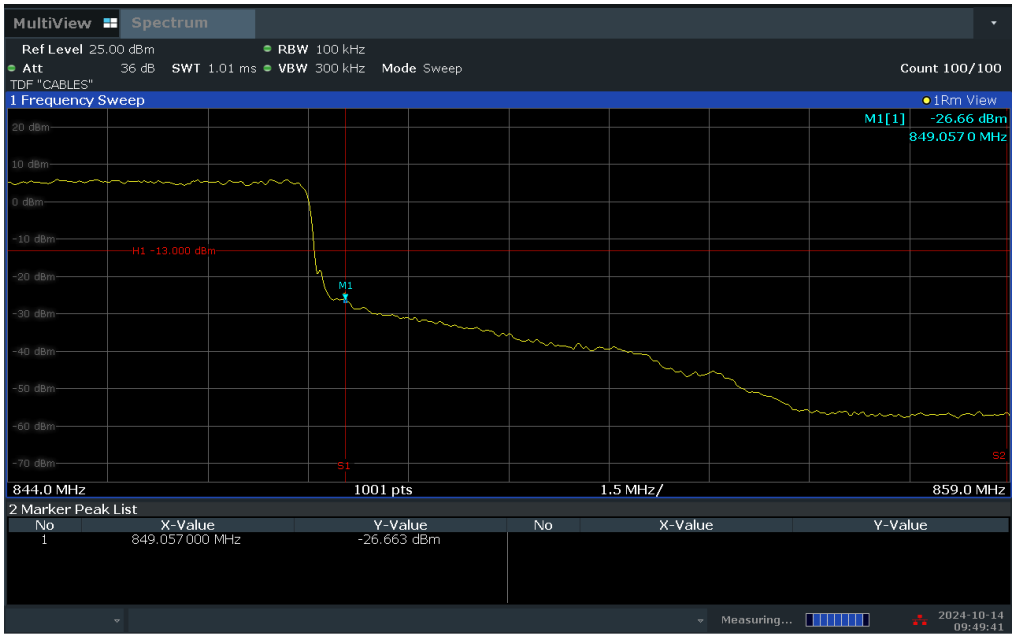
09:48:35 AM 10/14/2024

Plot 7-83. Upper BE Plot (LTE Band 26 - 5MHz QPSK – Full RB Configuration)



09:49:09 AM 10/14/2024

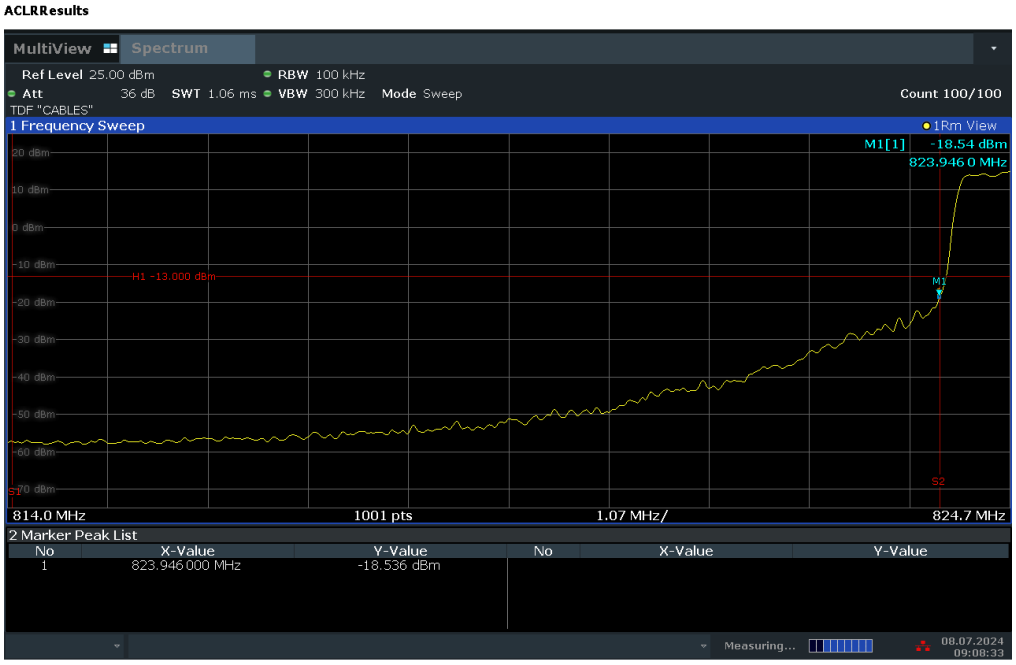
Plot 7-84. Lower BE Plot (LTE Band 26 - 10MHz QPSK – Full RB Configuration)



09:49:42 AM 10/14/2024

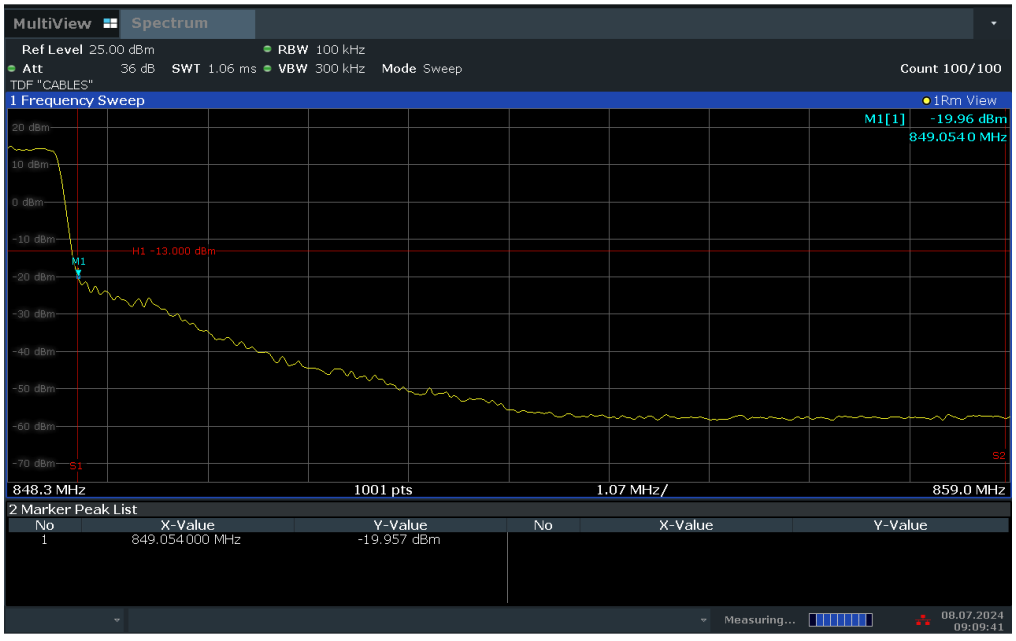
Plot 7-85. Upper BE Plot (LTE Band 26 - 10MHz QPSK – Full RB Configuration)

LTE Band 5



09:08:33 08.07.2024

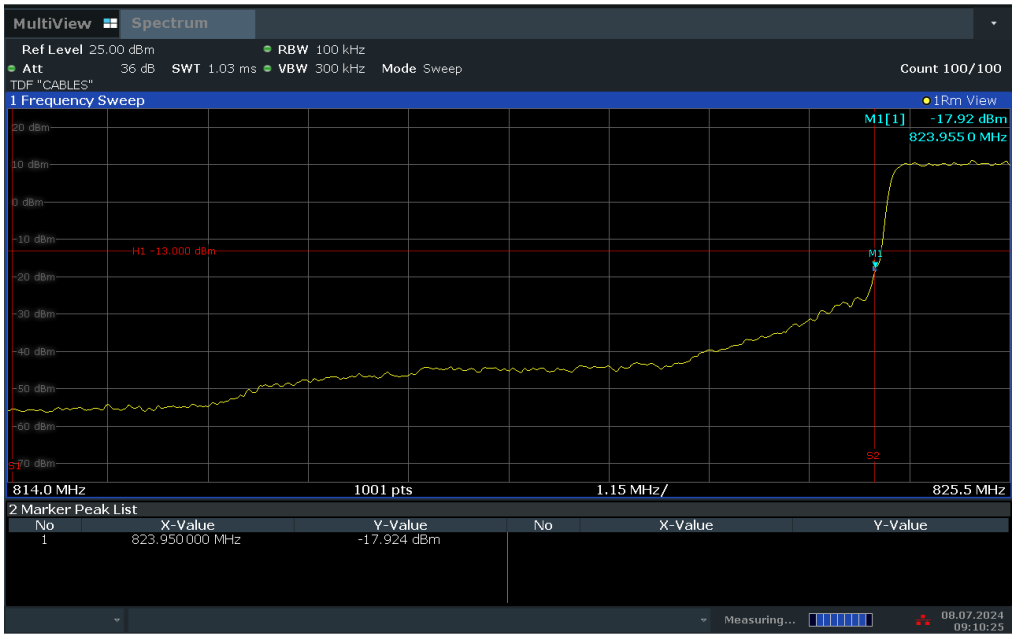
Plot 7-86. Lower BE Plot (LTE Band 5 – 1.4MHz QPSK – Full RB Configuration)



09:09:42 08.07.2024

Plot 7-87. Upper BE Plot (LTE Band 5 – 1.4MHz QPSK – Full RB Configuration)

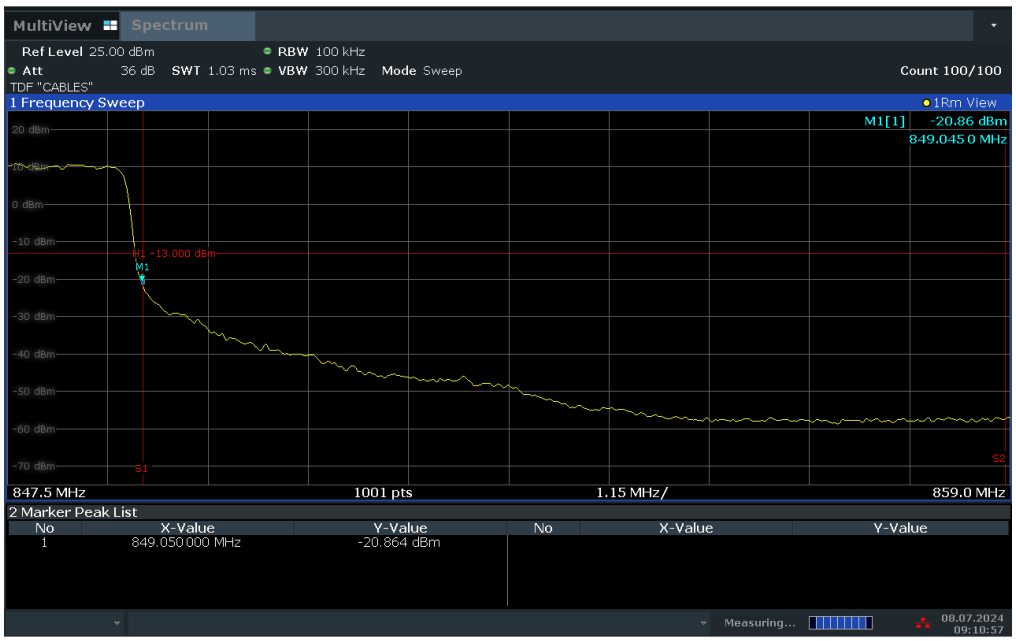
ACLRResults



09:10:25 08.07.2024

Plot 7-88. Lower BE Plot (LTE Band 5 - 3MHz QPSK – Full RB Configuration)

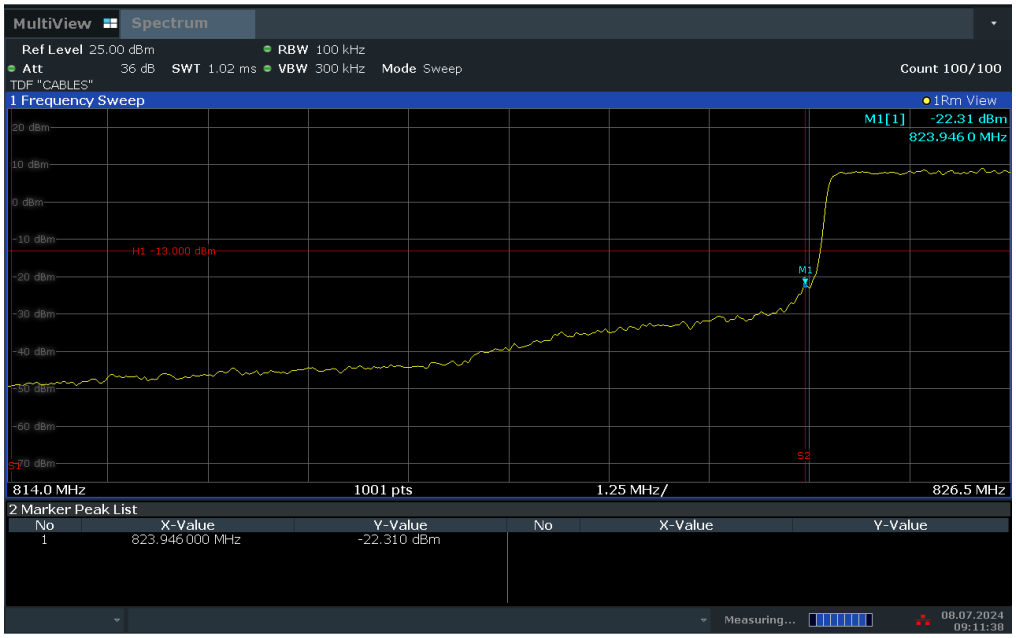
ACLRResults



09:10:58 08.07.2024

Plot 7-89. Upper BE Plot (LTE Band 5 - 3MHz QPSK – Full RB Configuration)

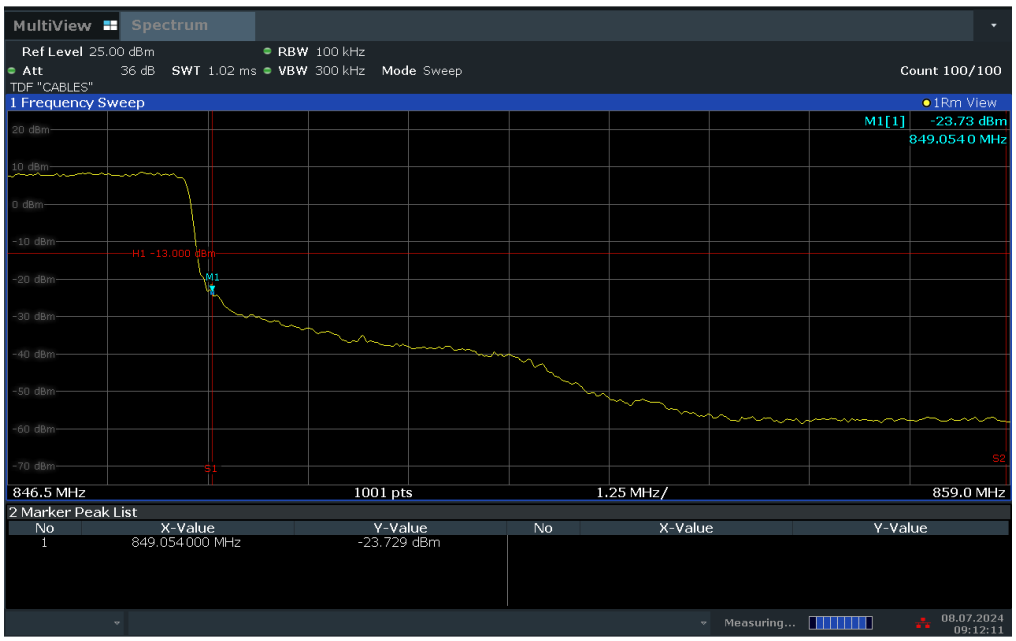
ACLRResults



09:11:39 08.07.2024

Plot 7-90. Lower BE Plot (LTE Band 5 - 5MHz QPSK – Full RB Configuration)

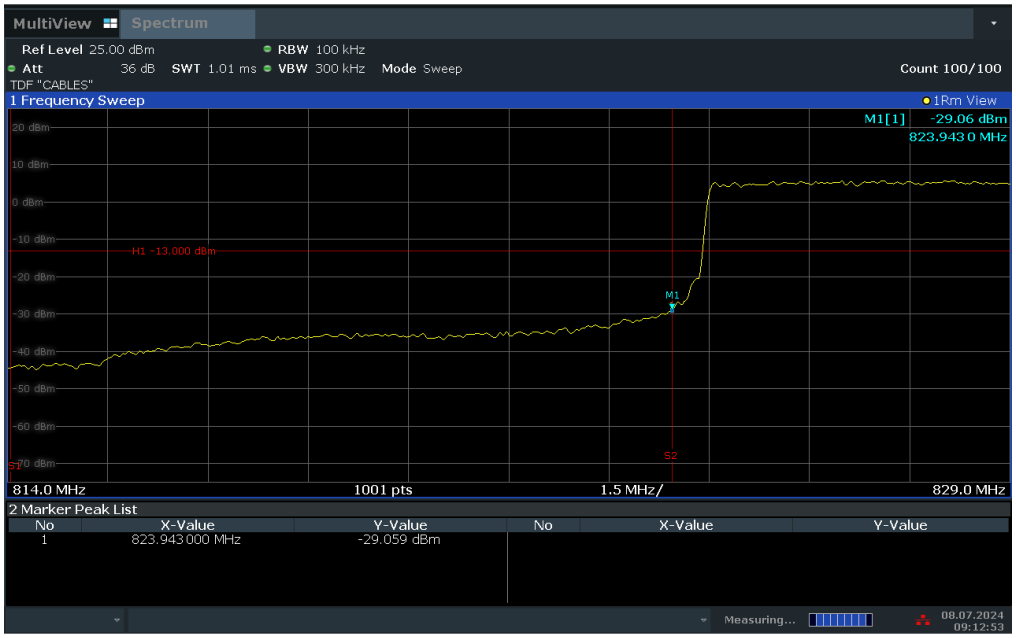
ACLRResults



09:12:12 08.07.2024

Plot 7-91. Upper BE Plot (LTE Band 5 - 5MHz QPSK – Full RB Configuration)

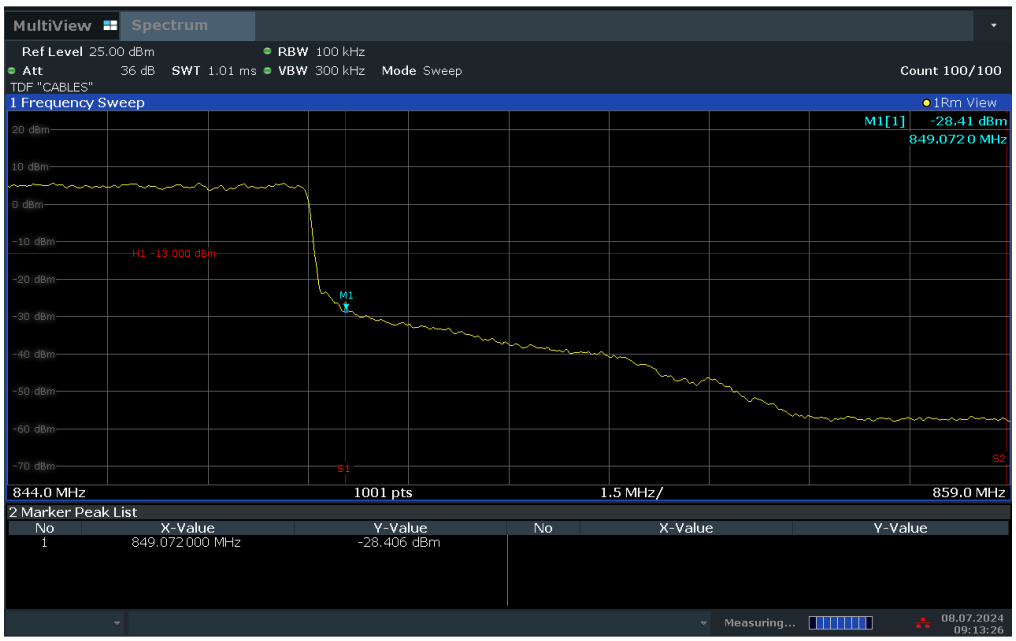
ACLRResults



09:12:54 08.07.2024

Plot 7-92. Lower BE Plot (LTE Band 5 - 10MHz QPSK – Full RB Configuration)

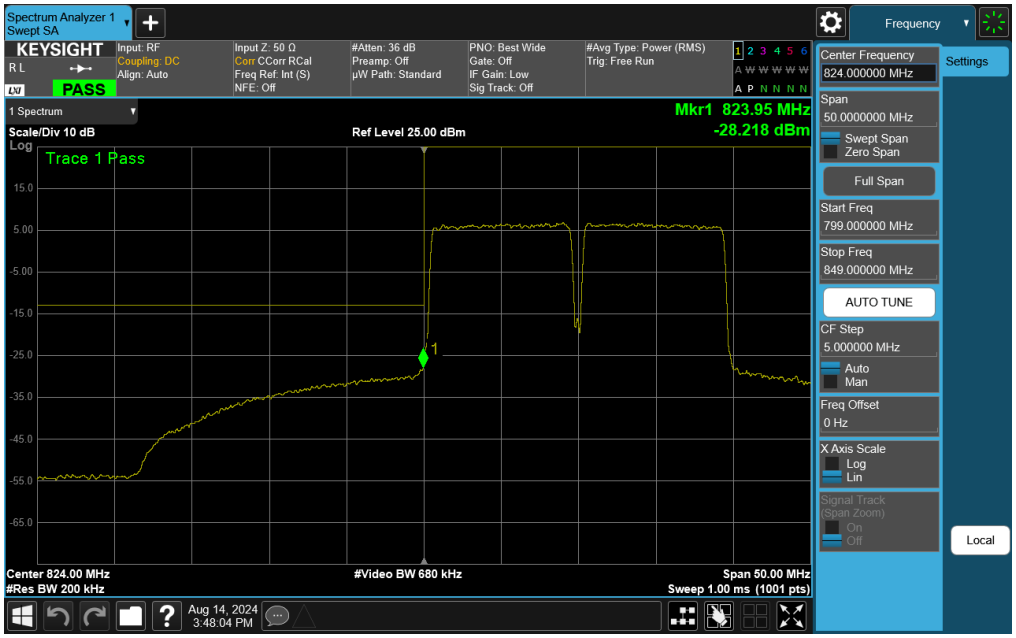
ACLRResults



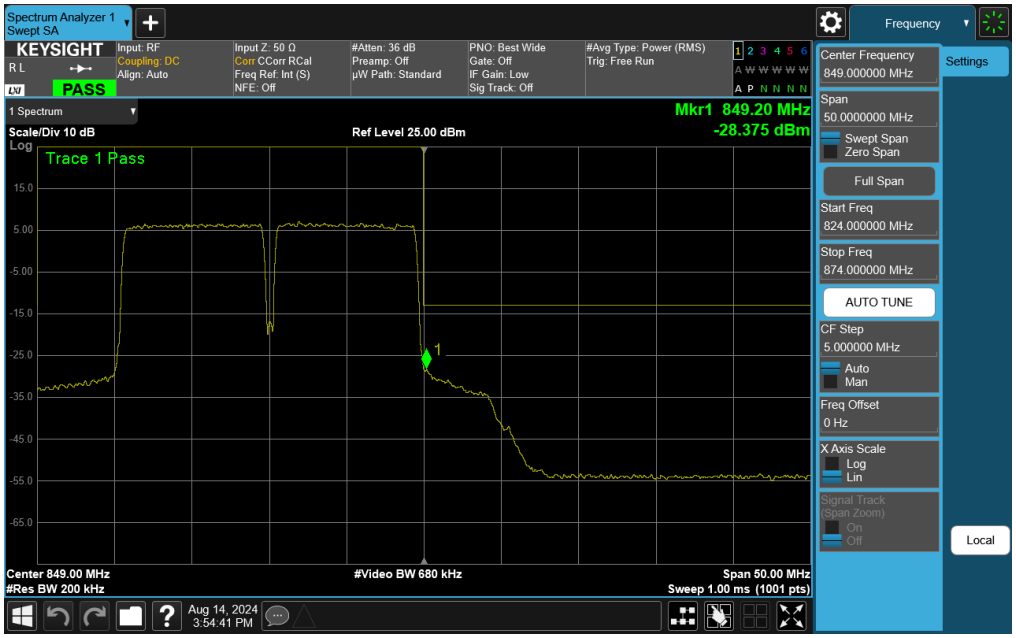
09:13:27 08.07.2024

Plot 7-93. Upper BE Plot (LTE Band 5 - 10MHz QPSK – Full RB Configuration)

ULCA - LTE Band 5

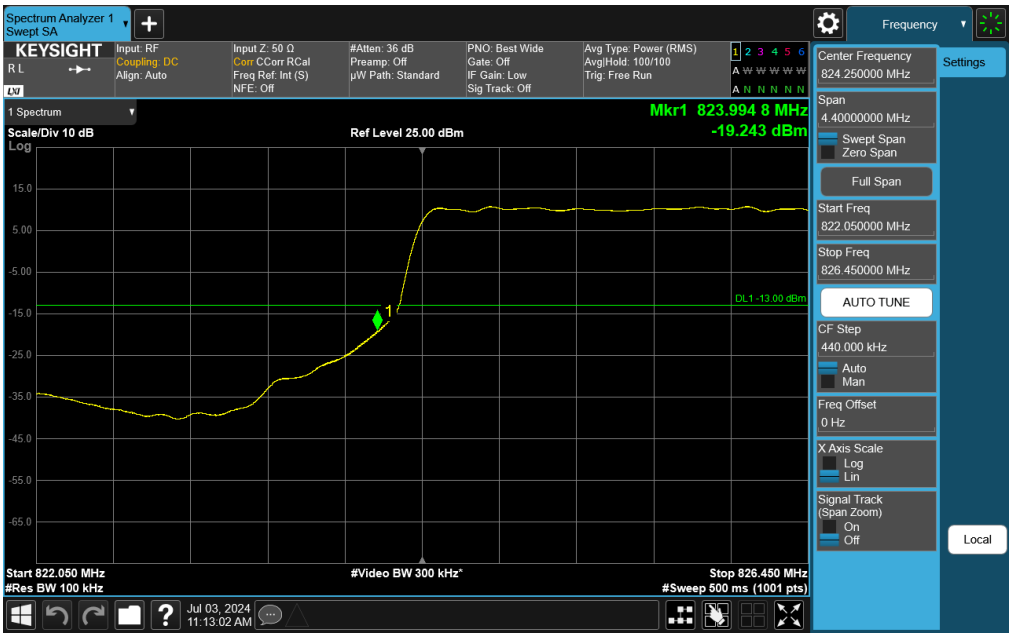


Plot 7-94. Lower BE Plot (ULCA – LTE Band 5 – (10 + 10)MHz QPSK – Full RB Configuration)

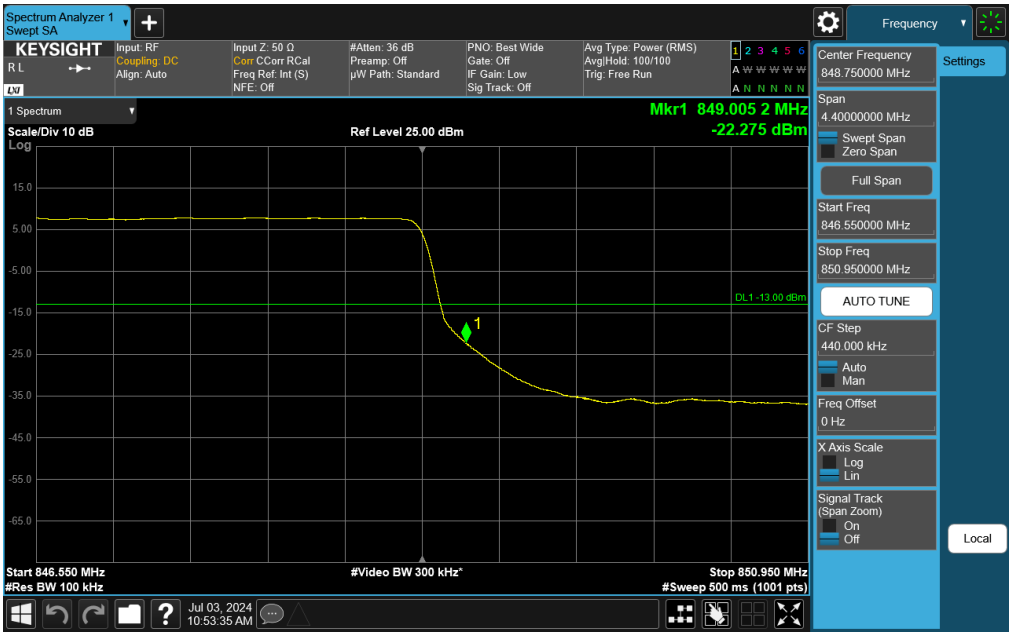


Plot 7-95. Upper BE Plot (ULCA – LTE Band 5 - (10 + 10)MHz QPSK – Full RB Configuration)

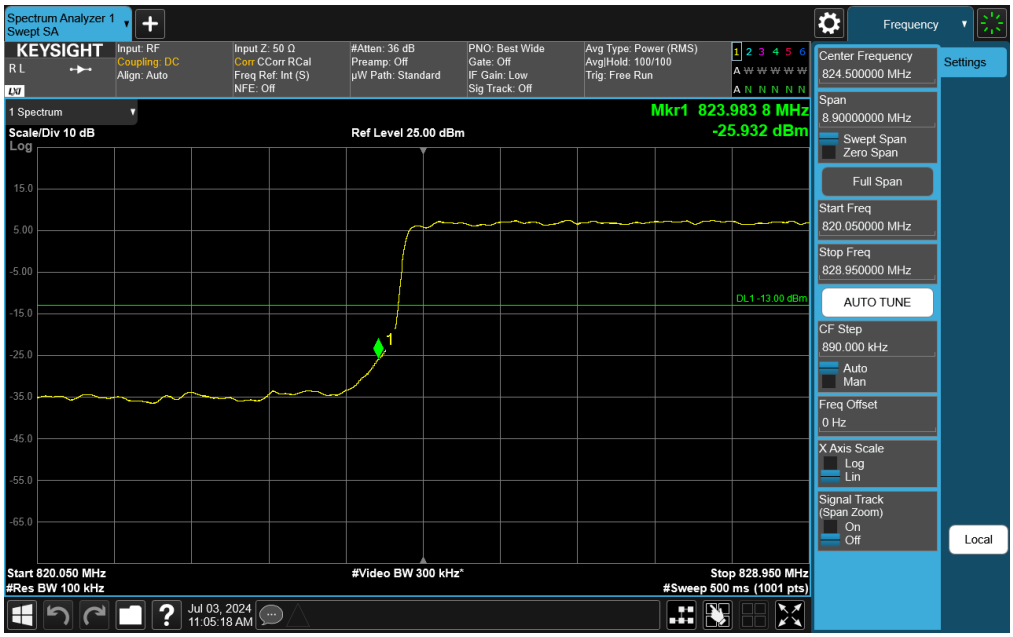
NR Band n26



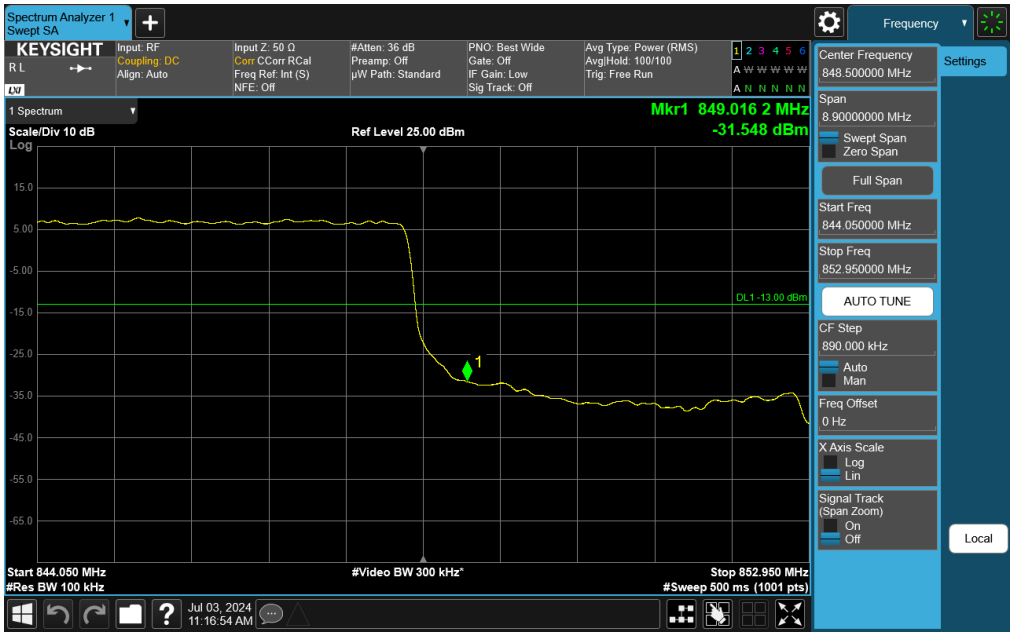
Plot 7-96. Lower BE Plot (NR Band n26 DFT-s-OFDM π/2 BPSK – 5.0MHz - Full RB)



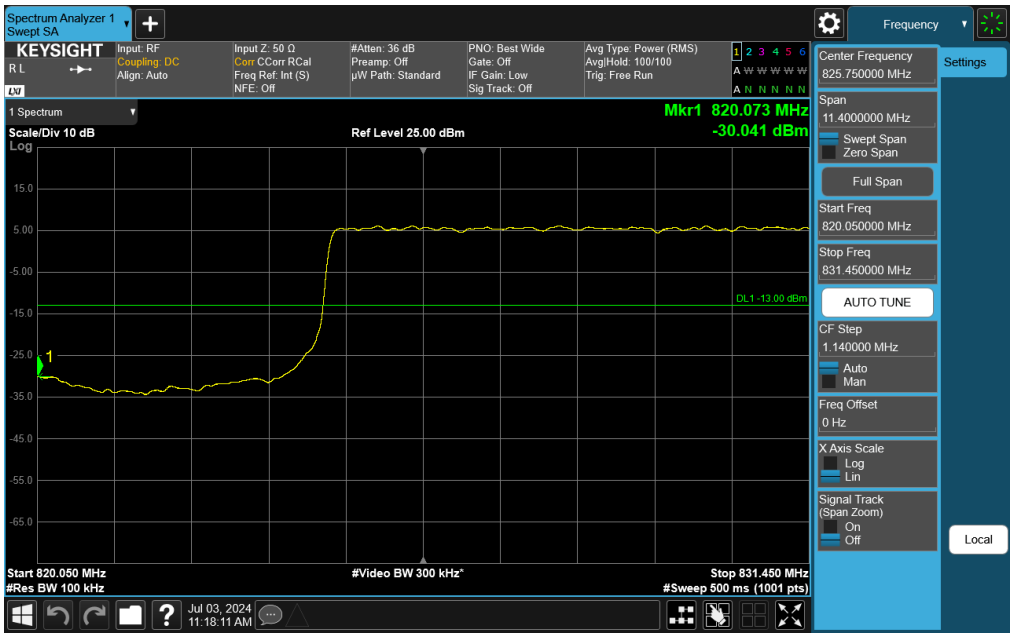
Plot 7-97. Upper BE Plot (NR Band n26 CP-OFDM QPSK – 5.0MHz - Full RB)



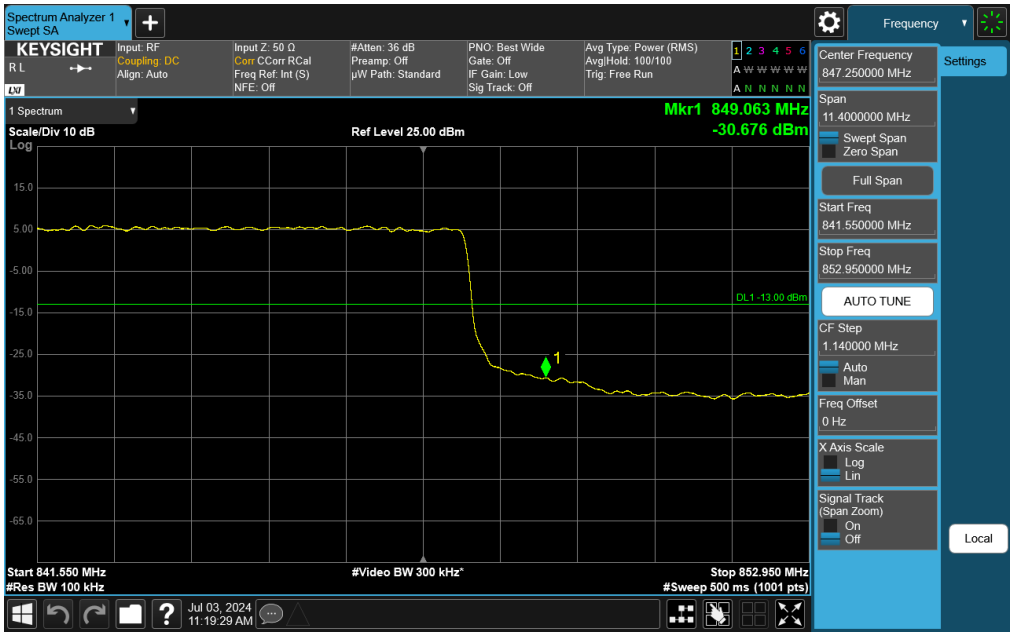
Plot 7-98. Lower BE Plot (NR Band n26 DFT-s-OFDM QPSK – 10.0MHz - Full RB)



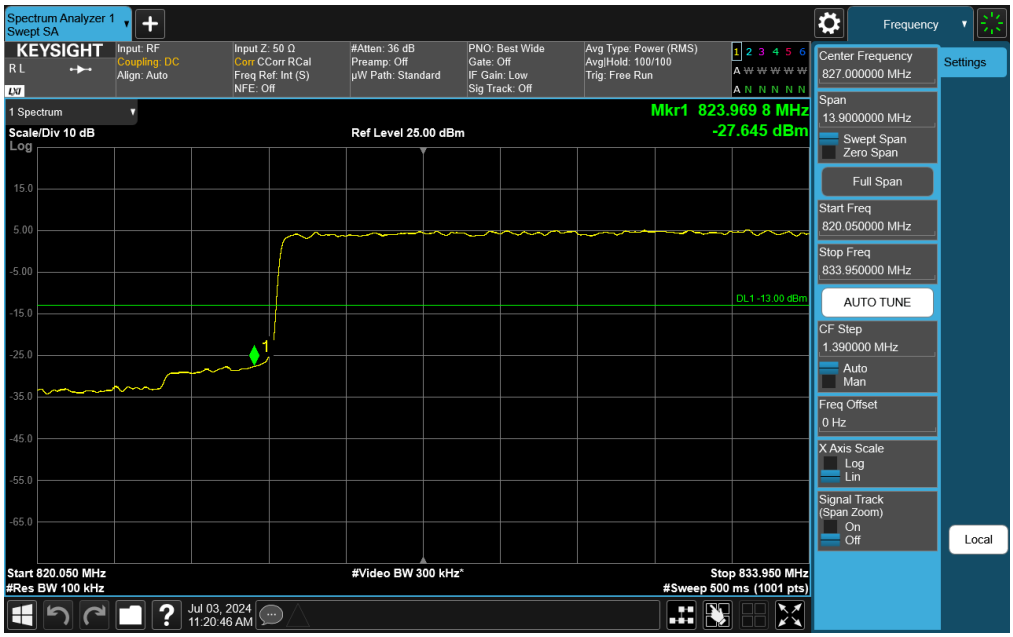
Plot 7-99. Upper BE Plot (NR Band n26 DFT-s-OFDM π/2 BPSK – 10.0MHz - Full RB)



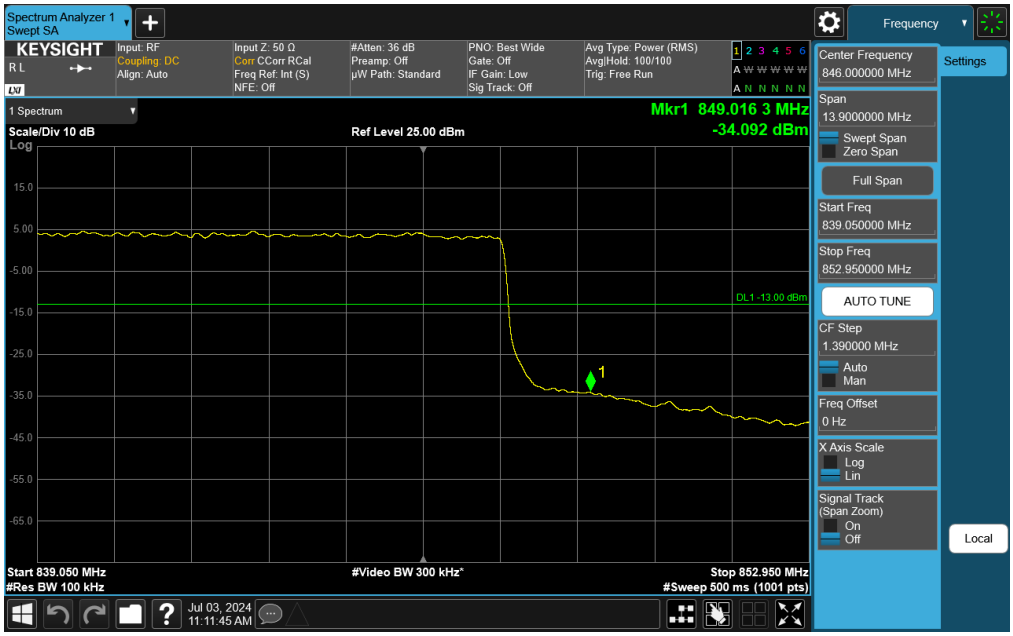
Plot 7-100. Lower BE Plot (NR Band n26 DFT-s-OFDM π/2 BPSK – 15.0MHz - Full RB)



Plot 7-101. Upper BE Plot (NR Band n26 DFT-s-OFDM π/2 BPSK – 15.0MHz - Full RB)



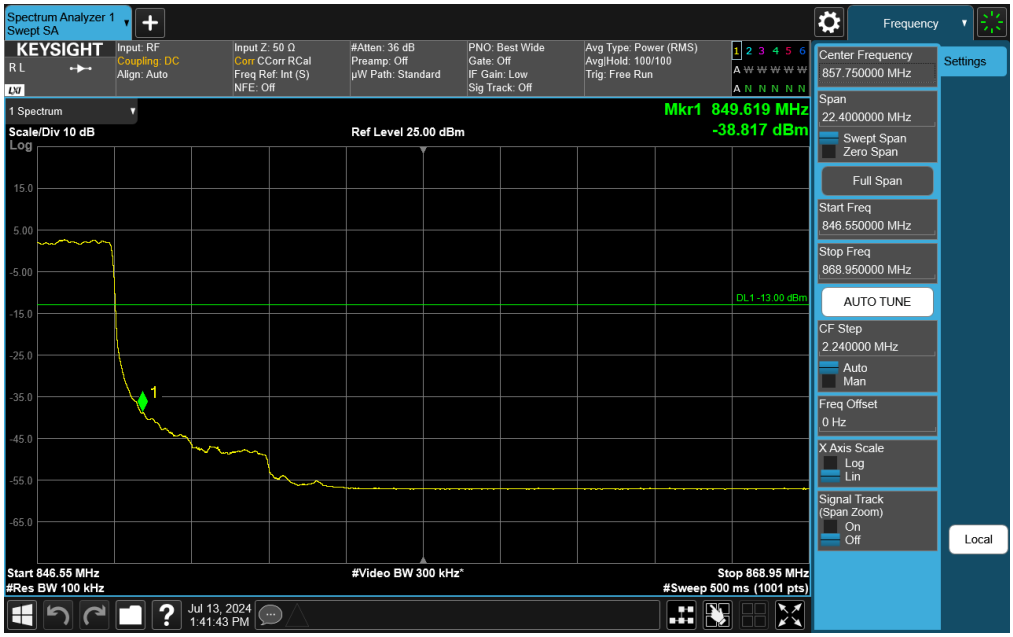
Plot 7-102. Lower BE Plot (NR Band n26 DFT-s-OFDM π/2 BPSK – 20.0MHz - Full RB)



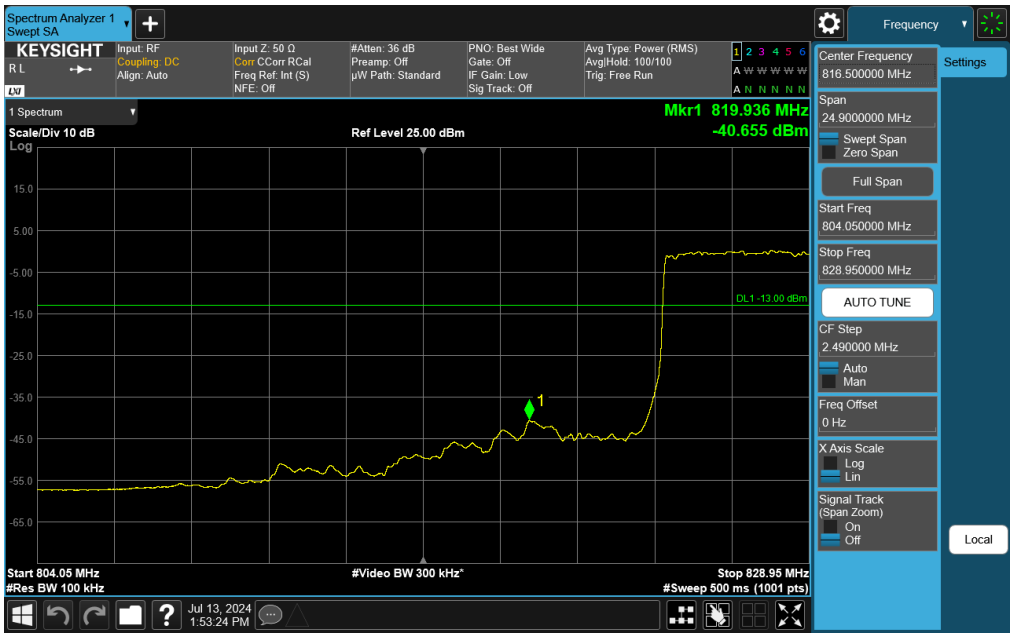
Plot 7-103. Upper BE Plot (NR Band n26 DFT-s- OFDM QPSK – 20.0MHz - Full RB)

NR Band n5

Plot 7-104. Lower BE Plot (NR Band n5 DFT-s-OFDM π/2 BPSK – 5.0MHz - Full RB)

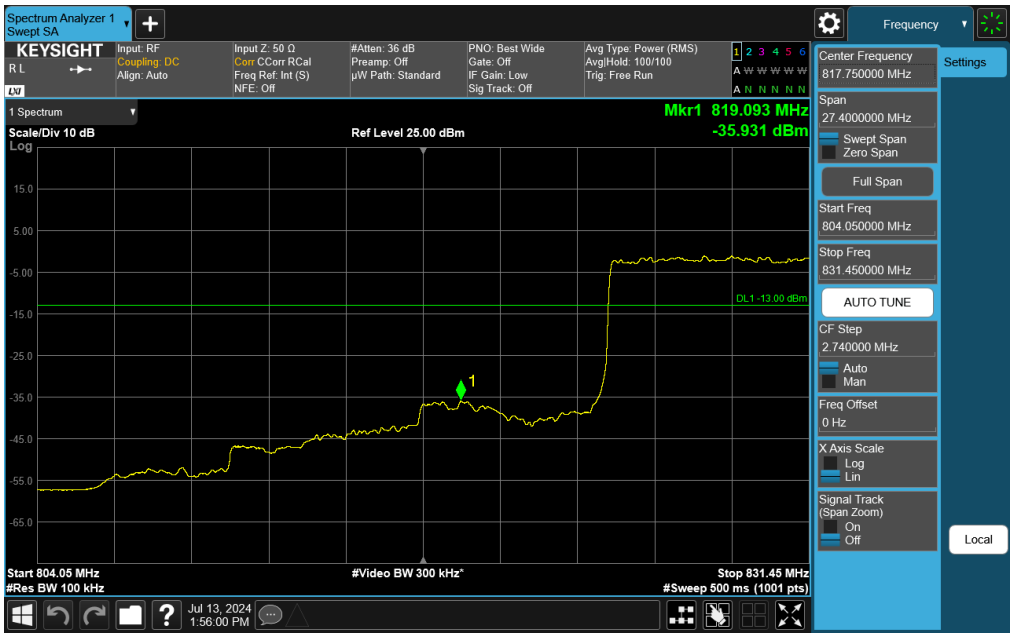


Plot 7-105. Upper BE Plot (NR Band n5 DFT-s-OFDM QPSK – 5.0MHz - Full RB)

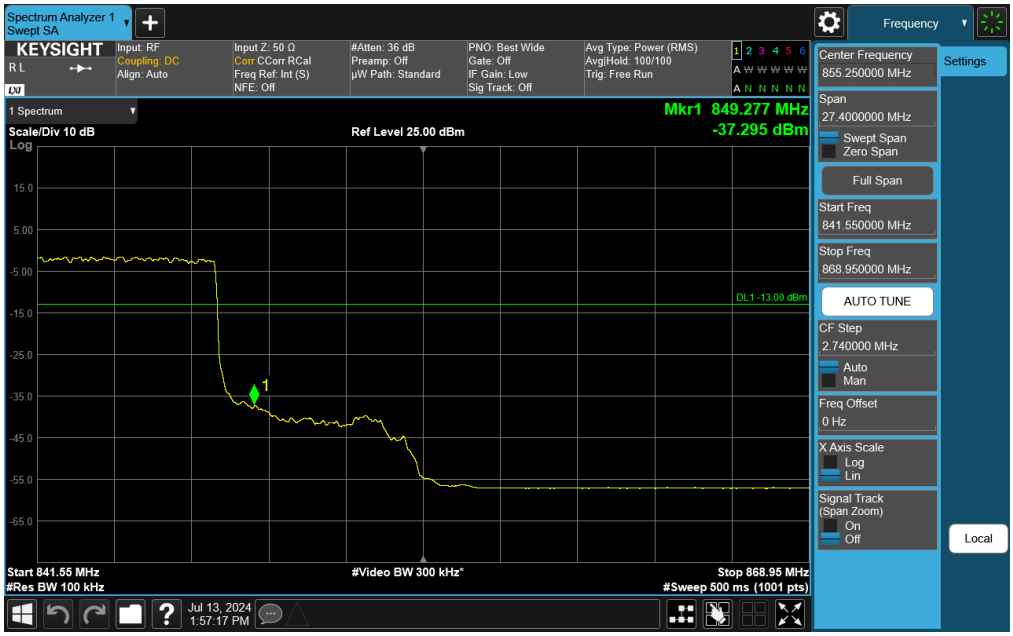


Plot 7-106. Lower BE Plot (NR Band n5 DFT-s-OFDM π/2 BPSK – 10.0MHz - Full RB)

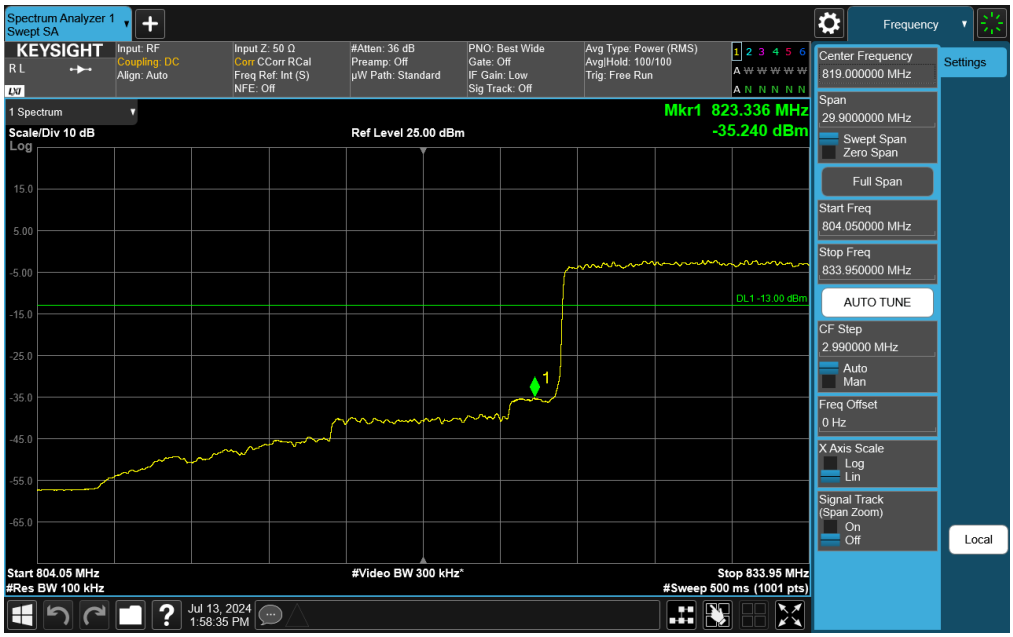
Plot 7-107. Upper BE Plot (NR Band n5 DFT-s-OFDM QPSK – 10.0MHz - Full RB)



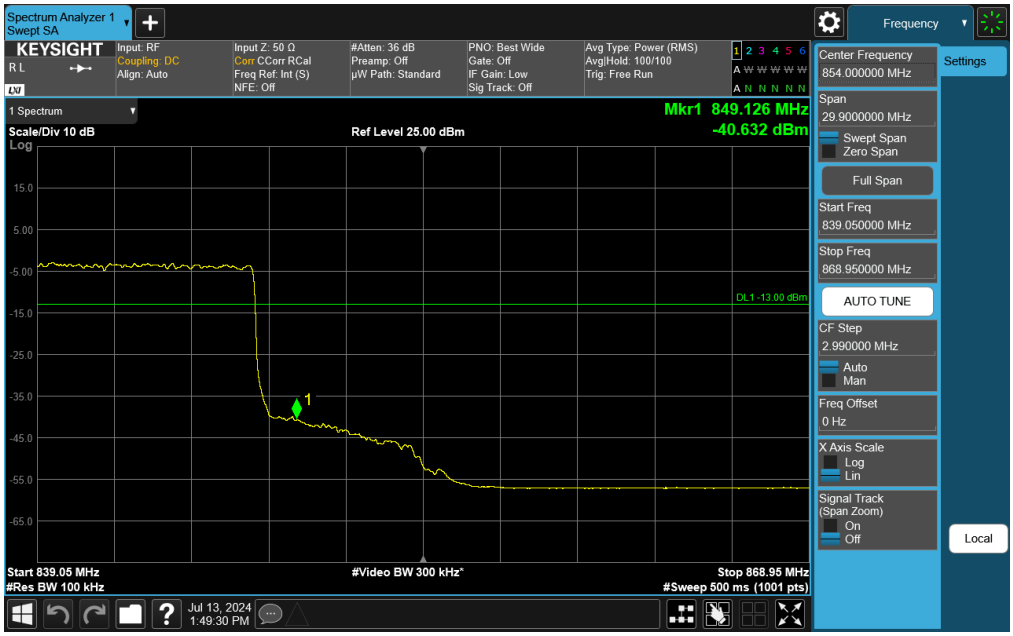
Plot 7-108. Lower BE Plot (NR Band n5 DFT-s-OFDM π/2 BPSK – 15.0MHz - Full RB)



Plot 7-109. Upper BE Plot (NR Band n5 DFT-s-OFDM π/2 BPSK – 15.0MHz - Full RB)

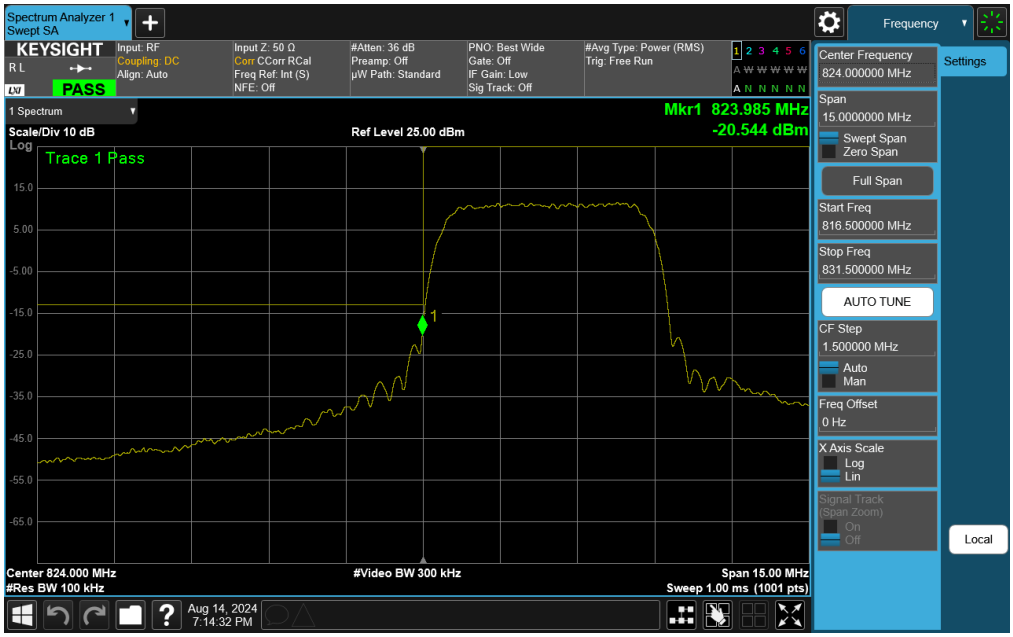


Plot 7-110. Lower BE Plot (NR Band n5 DFT-s-OFDM π/2 BPSK – 20.0MHz - Full RB)

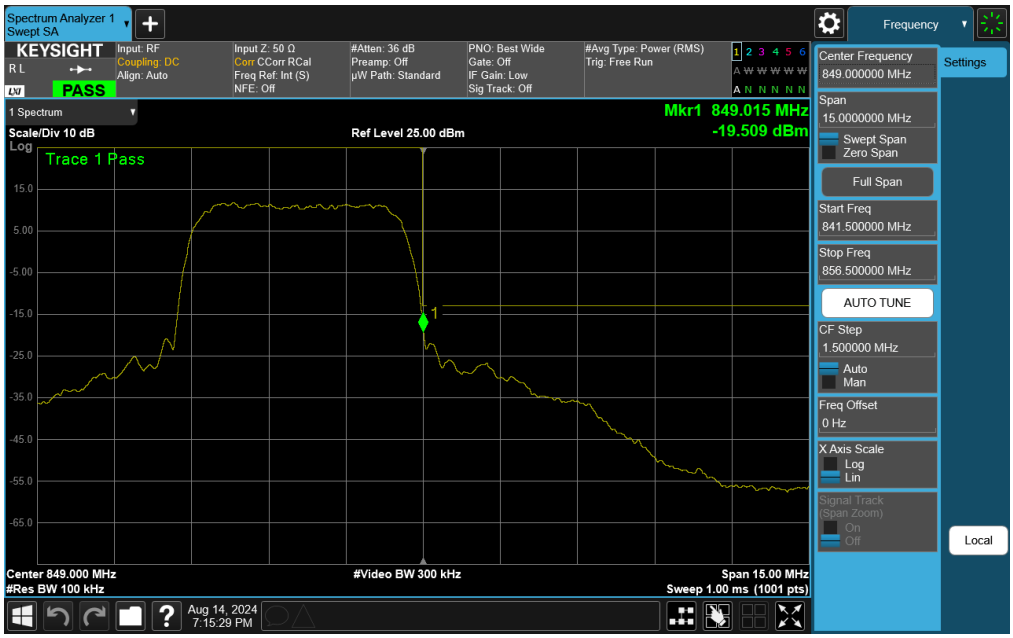


Plot 7-111. Upper BE Plot (NR Band n5 DFT-s-OFDM QPSK – 20.0MHz - Full RB)

WCDMA Cell



Plot 7-112. Lower BE Plot (WCDMA Cell – Ch. 4132)



Plot 7-113. Upper BE Plot (WCDMA Cell – Ch. 4233)

7.5 Radiated Power (ERP)

§22.913(a)(5)

Test Overview

Effective Radiated Power (ERP) measurements are calculated by adding highest antenna gain to maximum measured conducted output power. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1
ANSI C63.26-2015 – Section 5.2.5.5

Test Settings

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

ERP = PMeas – LC + GT

Where:

ERP = Effective Radiated Power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

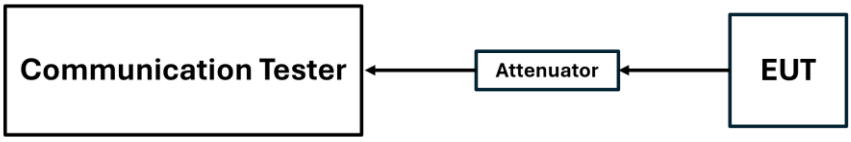


Figure 7-7. LTE Test Instrument & Measurement Setup

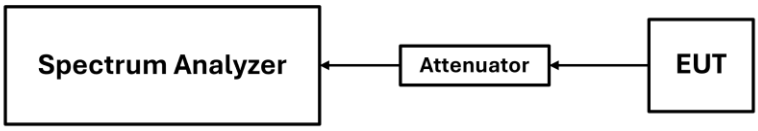


Figure 7-8. FR1 Test Instrument & Measurement Setup

Test Notes:

1. The EUT was tested in all possible test configurations. The worst case emissions are reported with the EUT modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2. This unit was tested with its standard battery.

3. The Level (dBm) readings in the table were taken with a correction table loaded into the base station simulator. The correction table was used to account for the signal attenuation in the connecting cable between the transmitter and antenna.

4. Uplink carrier aggregation for LTE B5 is only supported in this EUT while operating in Power Class 3.

5. Conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.

6. The Ant. Gains (GT) are listed in dBi.

7.5.1 Antenna 4 – ERP

LTE Band 26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	824.7	-2.40	1 / 0	25.49	20.94	0.124	38.45	-17.51
		836.5	-2.40	1 / 0	25.54	20.99	0.126	38.45	-17.46
		848.3	-2.40	1 / 0	25.70	**21.15**	0.130	38.45	-17.30
	16-QAM	836.5	-2.40	1 / 5	24.81	**20.26**	0.106	38.45	-18.19
	64-QAM	824.7	-2.40	1 / 0	23.74	**19.19**	0.083	38.45	-19.26
	256-QAM	848.3	-2.40	1 / 3	20.78	**16.23**	0.042	38.45	-22.22
3 MHz	QPSK	825.5	-2.40	1 / 0	25.47	20.92	0.124	38.45	-17.53
		836.5	-2.40	1 / 0	25.48	**20.93**	0.124	38.45	-17.52
		847.5	-2.40	1 / 0	25.48	20.93	0.124	38.45	-17.52
	16-QAM	836.5	-2.40	1 / 0	24.84	**20.29**	0.107	38.45	-18.16
	64-QAM	847.5	-2.40	1 / 0	23.93	**19.38**	0.087	38.45	-19.07
	256-QAM	847.5	-2.40	1 / 14	20.76	**16.21**	0.042	38.45	-22.24
5 MHz	QPSK	826.5	-2.40	1 / 0	25.70	**21.15**	0.130	38.45	-17.30
		836.5	-2.40	1 / 12	25.50	20.95	0.124	38.45	-17.50
		846.5	-2.40	1 / 0	25.69	21.14	0.130	38.45	-17.31
	16-QAM	846.5	-2.40	1 / 0	24.98	**20.43**	0.110	38.45	-18.02
	64-QAM	846.5	-2.40	1 / 0	23.90	**19.35**	0.086	38.45	-19.10
	256-QAM	846.5	-2.40	1 / 0	20.88	**16.33**	0.043	38.45	-22.12
10 MHz	QPSK	829.0	-2.40	1 / 49	25.57	**21.02**	0.126	38.45	-17.43
		836.5	-2.40	1 / 25	25.54	20.99	0.126	38.45	-17.46
		844.0	-2.40	1 / 0	25.56	21.01	0.126	38.45	-17.44
	16-QAM	844.0	-2.40	1 / 25	24.90	**20.35**	0.108	38.45	-18.10
	64-QAM	836.5	-2.40	1 / 0	23.82	**19.27**	0.085	38.45	-19.18
	256-QAM	836.5	-2.40	1 / 0	20.76	**16.21**	0.042	38.45	-22.24

Table 7-2. Antenna 4 ERP Data (LTE Band 26)

LTE Band 5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	824.7	-2.40	1 / 5	25.29	20.74	0.119	38.45	-17.71
		836.5	-2.40	1 / 5	25.66	21.11	0.129	38.45	-17.34
		848.3	-2.40	1 / 0	25.70	**21.15**	0.130	38.45	-17.30
	16-QAM	836.5	-2.40	1 / 3	24.71	**20.16**	0.104	38.45	-18.29
	64-QAM	836.5	-2.40	1 / 5	23.65	**19.10**	0.081	38.45	-19.35
	256-QAM	848.3	-2.40	1 / 0	20.75	**16.20**	0.042	38.45	-22.25
3 MHz	QPSK	825.5	-2.40	1 / 7	25.67	21.12	0.129	38.45	-17.33
		836.5	-2.40	1 / 14	25.70	**21.15**	0.130	38.45	-17.30
		847.5	-2.40	1 / 7	25.69	21.14	0.130	38.45	-17.31
	16-QAM	825.5	-2.40	1 / 7	24.57	**20.02**	0.100	38.45	-18.43
	64-QAM	825.5	-2.40	1 / 0	23.66	**19.11**	0.081	38.45	-19.34
	256-QAM	825.5	-2.40	1 / 14	20.81	**16.26**	0.042	38.45	-22.19
5 MHz	QPSK	826.5	-2.40	1 / 12	25.69	21.14	0.130	38.45	-17.31
		836.5	-2.40	1 / 24	25.70	**21.15**	0.130	38.45	-17.30
		846.5	-2.40	1 / 0	25.54	20.99	0.126	38.45	-17.46
	16-QAM	826.5	-2.40	1 / 24	24.73	**20.18**	0.104	38.45	-18.27
	64-QAM	826.5	-2.40	1 / 0	23.55	**19.00**	0.079	38.45	-19.45
	256-QAM	846.5	-2.40	1 / 24	20.80	**16.25**	0.042	38.45	-22.20
10 MHz	QPSK	829.0	-2.40	1 / 49	25.55	21.00	0.126	38.45	-17.45
		836.5	-2.40	1 / 49	25.46	20.91	0.123	38.45	-17.54
		844.0	-2.40	1 / 25	25.70	**21.15**	0.130	38.45	-17.30
	16-QAM	844.0	-2.40	1 / 25	24.72	**20.17**	0.104	38.45	-18.28
	64-QAM	836.5	-2.40	1 / 49	23.72	**19.17**	0.083	38.45	-19.28
	256-QAM	844.0	-2.40	1 / 49	20.81	**16.26**	0.042	38.45	-22.19

Table 7-3. Antenna 4 ERP Data (LTE Band 5)

ULCA - LTE Band 5

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset						
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	25.42	-2.40	20.87	0.122	38.45	-17.58
				20475	831.5	1	49		20574	841.4	1	0	25.38	-2.40	20.83	0.121	38.45	-17.62
				20600	844.0	1	0		20501	834.1	1	49	25.53	-2.40	**20.98**	**0.125**	38.45	-17.47
			QPSK	20600	844	50	0	QPSK	20501	834.1	50	0	24.78	-2.40	20.23	0.105	38.45	-18.22
			16-QAM	20600	844	50	0	16-QAM	20501	834.1	50	0	23.82	-2.40	19.27	0.085	38.45	-19.18
			64-QAM	20600	844	50	0	64-QAM	20501	834.1	50	0	23.79	-2.40	19.24	0.084	38.45	-19.21
			256-QAM	20600	844	50	0	256-QAM	20501	834.1	50	0	21.59	-2.40	17.04	0.051	38.45	-21.41

Table 7-4. Antenna 4 ERP Data (ULCA LTE Band 5)

NR Band n26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	826.5	-2.40	1 / 1	25.67	21.12	0.129	38.45	-17.33
		836.5	-2.40	1 / 1	25.70	**21.15**	0.130	38.45	-17.30
		846.5	-2.40	1 / 23	25.58	21.03	0.127	38.45	-17.42
	QPSK	826.5	-2.40	1 / 1	25.67	**21.12**	0.129	38.45	-17.33
		836.5	-2.40	1 / 1	25.40	20.85	0.122	38.45	-17.60
		846.5	-2.40	1 / 12	25.46	20.91	0.123	38.45	-17.54
	16-QAM	836.5	-2.40	1 / 1	24.69	**20.14**	0.103	38.45	-18.31
	64-QAM	826.5	-2.40	1 / 12	23.61	**19.06**	0.081	38.45	-19.39
	256-QAM	826.5	-2.40	1 / 23	20.79	**16.24**	0.042	38.45	-22.21
10 MHz	π/2 BPSK	829.0	-2.40	1 / 1	25.63	21.08	0.128	38.45	-17.37
		836.5	-2.40	1 / 25	25.45	20.90	0.123	38.45	-17.55
		844.0	-2.40	1 / 1	25.68	**21.13**	0.130	38.45	-17.32
	QPSK	829.0	-2.40	1 / 25	25.70	**21.15**	0.130	38.45	-17.30
		836.5	-2.40	1 / 50	25.70	21.15	0.130	38.45	-17.30
		844.0	-2.40	1 / 50	25.63	21.08	0.128	38.45	-17.37
	16-QAM	844.0	-2.40	1 / 50	24.68	**20.13**	0.103	38.45	-18.32
	64-QAM	844.0	-2.40	1 / 50	23.69	**19.14**	0.082	38.45	-19.31
	256-QAM	836.5	-2.40	1 / 50	20.76	**16.21**	0.042	38.45	-22.24
15 MHz	π/2 BPSK	831.5	-2.40	1 / 36	25.70	**21.15**	0.130	38.45	-17.30
		836.5	-2.40	1 / 1	25.55	21.00	0.126	38.45	-17.45
		841.5	-2.40	1 / 36	25.63	21.08	0.128	38.45	-17.37
	QPSK	831.5	-2.40	1 / 36	25.45	20.90	0.123	38.45	-17.55
		836.5	-2.40	1 / 36	25.44	20.89	0.123	38.45	-17.56
		841.5	-2.40	1 / 36	25.64	**21.09**	0.129	38.45	-17.36
	16-QAM	831.5	-2.40	1 / 1	24.54	**19.99**	0.100	38.45	-18.46
	64-QAM	836.5	-2.40	1 / 1	23.68	**19.13**	0.082	38.45	-19.32
	256-QAM	841.5	-2.40	1 / 36	20.78	**16.23**	0.042	38.45	-22.22
20 MHz	π/2 BPSK	834.0	-2.40	1 / 50	25.63	21.08	0.128	38.45	-17.37
		836.5	-2.40	1 / 104	25.69	**21.14**	0.130	38.45	-17.31
		839.0	-2.40	1 / 1	25.66	21.11	0.129	38.45	-17.34
	QPSK	834.0	-2.40	1 / 50	25.70	**21.15**	0.130	38.45	-17.30
		836.5	-2.40	1 / 50	25.54	20.99	0.126	38.45	-17.46
		839.0	-2.40	1 / 1	25.60	21.05	0.127	38.45	-17.40
	16-QAM	836.5	-2.40	1 / 104	24.72	**20.17**	0.104	38.45	-18.28
	64-QAM	839.0	-2.40	1 / 50	23.73	**19.18**	0.083	38.45	-19.27
	256-QAM	839.0	-2.40	1 / 104	20.73	**16.18**	0.041	38.45	-22.27

Table 7-5. Antenna 4 ERP Data (NR Band n26)

NR Band n5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	826.5	-2.40	1 / 12	25.44	20.89	0.123	38.45	-17.56
		836.5	-2.40	1 / 1	25.64	21.09	0.129	38.45	-17.36
		846.5	-2.40	1 / 12	25.70	**21.15**	0.130	38.45	-17.30
	QPSK	826.5	-2.40	1 / 1	25.48	20.93	0.124	38.45	-17.52
		836.5	-2.40	1 / 12	25.67	**21.12**	0.129	38.45	-17.33
		846.5	-2.40	1 / 12	25.65	21.10	0.129	38.45	-17.35
	16-QAM	836.5	-2.40	1 / 1	24.72	**20.17**	0.104	38.45	-18.28
	64-QAM	846.5	-2.40	1 / 12	23.64	**19.09**	0.081	38.45	-19.36
	256-QAM	836.5	-2.40	1 / 12	20.72	**16.17**	0.041	38.45	-22.28
10 MHz	π/2 BPSK	829.0	-2.40	1 / 50	25.59	21.04	0.127	38.45	-17.41
		836.5	-2.40	1 / 50	25.70	**21.15**	0.130	38.45	-17.30
		844.0	-2.40	1 / 1	25.68	21.13	0.130	38.45	-17.32
	QPSK	829.0	-2.40	1 / 1	25.52	20.97	0.125	38.45	-17.48
		836.5	-2.40	1 / 50	25.60	21.05	0.127	38.45	-17.40
		844.0	-2.40	1 / 1	25.69	**21.14**	0.130	38.45	-17.31
	16-QAM	836.5	-2.40	1 / 1	24.64	**20.09**	0.102	38.45	-18.36
	64-QAM	844.0	-2.40	1 / 25	23.70	**19.15**	0.082	38.45	-19.30
	256-QAM	844.0	-2.40	1 / 1	20.78	**16.23**	0.042	38.45	-22.22
15 MHz	π/2 BPSK	831.5	-2.40	1 / 77	25.66	**21.11**	0.129	38.45	-17.34
		836.5	-2.40	1 / 36	25.40	20.85	0.122	38.45	-17.60
		841.5	-2.40	1 / 36	25.37	20.82	0.121	38.45	-17.63
	QPSK	831.5	-2.40	1 / 36	25.70	**21.15**	0.130	38.45	-17.30
		836.5	-2.40	1 / 77	25.70	21.15	0.130	38.45	-17.30
		841.5	-2.40	1 / 36	25.70	21.15	0.130	38.45	-17.30
	16-QAM	841.5	-2.40	1 / 36	24.61	**20.06**	0.101	38.45	-18.39
	64-QAM	841.5	-2.40	1 / 36	23.62	**19.07**	0.081	38.45	-19.38
	256-QAM	831.5	-2.40	1 / 77	20.76	**16.21**	0.042	38.45	-22.24
20 MHz	π/2 BPSK	834.0	-2.40	1 / 104	25.66	**21.11**	0.129	38.45	-17.34
		836.5	-2.40	1 / 1	25.38	20.83	0.121	38.45	-17.62
		839.0	-2.40	1 / 50	25.45	20.90	0.123	38.45	-17.55
	QPSK	834.0	-2.40	1 / 104	25.57	21.02	0.126	38.45	-17.43
		836.5	-2.40	1 / 50	25.70	**21.15**	0.130	38.45	-17.30
		839.0	-2.40	1 / 104	25.43	20.88	0.122	38.45	-17.57
	16-QAM	839.0	-2.40	1 / 1	24.72	**20.17**	0.104	38.45	-18.28
	64-QAM	834.0	-2.40	1 / 1	23.74	**19.19**	0.083	38.45	-19.26
	256-QAM	839.0	-2.40	1 / 104	20.64	**16.09**	0.041	38.45	-22.36

Table 7-6. Antenna 4 ERP Data (NR Band n5)

WCDMA Cell

Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	25.38	-2.40	20.83	0.121	38.45	-17.62
836.60	WCDMA850	25.53	-2.40	**20.98**	**0.125**	38.45	-17.47
846.60	WCDMA850	25.43	-2.40	20.88	0.122	38.45	-17.57

Table 7-7. Antenna 4 ERP Data (WCDMA Cell)

7.5.2 Antenna 3b – ERP

LTE Band 26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	824.7	-0.40	1 / 5	24.85	22.30	0.170	38.45	-16.15
		836.5	-0.40	1 / 0	24.85	22.30	0.170	38.45	-16.15
		848.3	-0.40	1 / 3	24.98	**22.43**	0.175	38.45	-16.02
	16-QAM	836.5	-0.40	1 / 5	24.13	**21.58**	0.144	38.45	-16.87
	64-QAM	836.5	-0.40	1 / 0	23.02	**20.47**	0.111	38.45	-17.98
	256-QAM	848.3	-0.40	1 / 0	20.04	**17.49**	0.056	38.45	-20.96
3 MHz	QPSK	825.5	-0.40	1 / 0	24.93	**22.38**	0.173	38.45	-16.07
		836.5	-0.40	1 / 0	24.87	22.32	0.171	38.45	-16.13
		847.5	-0.40	1 / 0	24.89	22.34	0.171	38.45	-16.11
	16-QAM	825.5	-0.40	1 / 0	24.26	**21.71**	0.148	38.45	-16.74
	64-QAM	847.5	-0.40	1 / 14	23.15	**20.60**	0.115	38.45	-17.85
	256-QAM	825.5	-0.40	1 / 0	20.16	**17.61**	0.058	38.45	-20.84
5 MHz	QPSK	826.5	-0.40	1 / 0	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 0	24.98	22.43	0.175	38.45	-16.02
		846.5	-0.40	1 / 0	25.13	22.58	0.181	38.45	-15.87
	16-QAM	836.5	-0.40	1 / 0	24.46	**21.91**	0.155	38.45	-16.54
	64-QAM	846.5	-0.40	1 / 0	23.32	**20.77**	0.119	38.45	-17.68
	256-QAM	836.5	-0.40	1 / 0	20.31	**17.76**	0.060	38.45	-20.69
10 MHz	QPSK	829.0	-0.40	1 / 0	24.99	**22.44**	0.175	38.45	-16.01
		836.5	-0.40	1 / 49	24.93	22.38	0.173	38.45	-16.07
		844.0	-0.40	1 / 25	24.90	22.35	0.172	38.45	-16.10
	16-QAM	836.5	-0.40	1 / 0	24.29	**21.74**	0.149	38.45	-16.71
	64-QAM	829.0	-0.40	1 / 0	23.28	**20.73**	0.118	38.45	-17.72
	256-QAM	836.5	-0.40	1 / 0	20.11	**17.56**	0.057	38.45	-20.89

Table 7-8. Antenna 3b ERP Data (LTE Band 26)

LTE Band 5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
1.4 MHz	QPSK	824.7	-0.40	1 / 0	24.96	22.41	0.174	38.45	-16.04
		836.5	-0.40	1 / 0	25.07	22.52	0.179	38.45	-15.93
		848.3	-0.40	1 / 0	25.18	**22.63**	0.183	38.45	-15.82
	16-QAM	824.7	-0.40	1 / 0	24.31	**21.76**	0.150	38.45	-16.69
	64-QAM	836.5	-0.40	1 / 3	23.27	**20.72**	0.118	38.45	-17.73
	256-QAM	848.3	-0.40	1 / 0	20.16	**17.61**	0.058	38.45	-20.84
3 MHz	QPSK	825.5	-0.40	1 / 0	24.92	22.37	0.173	38.45	-16.08
		836.5	-0.40	1 / 0	24.94	22.39	0.173	38.45	-16.06
		847.5	-0.40	1 / 0	25.01	**22.46**	0.176	38.45	-15.99
	16-QAM	836.5	-0.40	1 / 0	24.31	**21.76**	0.150	38.45	-16.69
	64-QAM	847.5	-0.40	1 / 0	23.15	**20.60**	0.115	38.45	-17.85
	256-QAM	847.5	-0.40	1 / 0	20.23	**17.68**	0.059	38.45	-20.77
5 MHz	QPSK	826.5	-0.40	1 / 0	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 0	24.95	22.40	0.174	38.45	-16.05
		846.5	-0.40	1 / 0	25.17	22.62	0.183	38.45	-15.83
	16-QAM	836.5	-0.40	1 / 24	24.41	**21.86**	0.153	38.45	-16.59
	64-QAM	846.5	-0.40	1 / 0	23.38	**20.83**	0.121	38.45	-17.62
	256-QAM	846.5	-0.40	1 / 0	20.36	**17.81**	0.060	38.45	-20.64
10 MHz	QPSK	829.0	-0.40	1 / 25	25.03	**22.48**	0.177	38.45	-15.97
		836.5	-0.40	1 / 49	25.00	22.45	0.176	38.45	-16.00
		844.0	-0.40	1 / 25	24.99	22.44	0.175	38.45	-16.01
	16-QAM	836.5	-0.40	1 / 0	24.39	**21.84**	0.153	38.45	-16.61
	64-QAM	844.0	-0.40	1 / 0	23.24	**20.69**	0.117	38.45	-17.76
	256-QAM	829.0	-0.40	1 / 49	20.23	**17.68**	0.059	38.45	-20.77

Table 7-9. Antenna 3b ERP Data (LTE Band 5)

ULCA - LTE Band 5

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset						
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	24.86	-0.40	22.31	0.170	38.45	-16.14
				20475	831.5	1	49		20574	841.4	1	0	24.83	-0.40	22.28	0.169	38.45	-16.17
				20600	844.0	1	0		20501	834.1	1	49	24.91	-0.40	**22.36**	**0.172**	38.45	-16.09
			QPSK	20600	844	50	0	QPSK	20501	834.1	50	0	24.02	-0.40	21.47	0.140	38.45	-16.98
			16-QAM	20600	844	50	0	16-QAM	20501	834.1	50	0	23.34	-0.40	20.79	0.120	38.45	-17.66
			64-QAM	20600	844	50	0	64-QAM	20501	834.1	50	0	23.28	-0.40	20.73	0.118	38.45	-17.72
			256-QAM	20600	844	50	0	256-QAM	20501	834.1	50	0	21.12	-0.40	18.57	0.072	38.45	-19.88

Table 7-10. Antenna 3b ERP Data (ULCA LTE Band 5)

NR Band n26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	826.5	-0.40	1 / 23	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 1	25.16	22.61	0.182	38.45	-15.84
		846.5	-0.40	1 / 12	25.17	22.62	0.183	38.45	-15.83
	QPSK	826.5	-0.40	1 / 23	25.11	22.56	0.180	38.45	-15.89
		836.5	-0.40	1 / 1	25.11	22.56	0.180	38.45	-15.89
		846.5	-0.40	1 / 12	25.12	**22.57**	0.181	38.45	-15.88
	16-QAM	836.5	-0.40	1 / 1	24.21	**21.66**	0.147	38.45	-16.79
	64-QAM	826.5	-0.40	1 / 12	23.09	**20.54**	0.113	38.45	-17.91
	256-QAM	846.5	-0.40	1 / 23	20.31	**17.76**	0.060	38.45	-20.69
10 MHz	π/2 BPSK	829.0	-0.40	1 / 25	25.16	22.61	0.182	38.45	-15.84
		836.5	-0.40	1 / 1	25.02	22.47	0.177	38.45	-15.98
		844.0	-0.40	1 / 25	25.19	**22.64**	0.184	38.45	-15.81
	QPSK	829.0	-0.40	1 / 1	25.07	22.52	0.179	38.45	-15.93
		836.5	-0.40	1 / 1	25.20	**22.65**	0.184	38.45	-15.80
		844.0	-0.40	1 / 1	25.09	22.54	0.179	38.45	-15.91
	16-QAM	829.0	-0.40	1 / 25	24.21	**21.66**	0.147	38.45	-16.79
	64-QAM	829.0	-0.40	1 / 1	23.13	**20.58**	0.114	38.45	-17.87
	256-QAM	844.0	-0.40	1 / 50	20.28	**17.73**	0.059	38.45	-20.72
15 MHz	π/2 BPSK	831.5	-0.40	1 / 36	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 36	25.18	22.63	0.183	38.45	-15.82
		841.5	-0.40	1 / 36	25.19	22.64	0.184	38.45	-15.81
	QPSK	831.5	-0.40	1 / 36	25.18	**22.63**	0.183	38.45	-15.82
		836.5	-0.40	1 / 36	24.75	22.20	0.166	38.45	-16.25
		841.5	-0.40	1 / 36	25.13	22.58	0.181	38.45	-15.87
	16-QAM	831.5	-0.40	1 / 77	24.11	**21.56**	0.143	38.45	-16.89
	64-QAM	841.5	-0.40	1 / 36	23.14	**20.59**	0.115	38.45	-17.86
	256-QAM	836.5	-0.40	1 / 1	20.28	**17.73**	0.059	38.45	-20.72
20 MHz	π/2 BPSK	834.0	-0.40	1 / 1	24.96	22.41	0.174	38.45	-16.04
		836.5	-0.40	1 / 1	25.06	**22.51**	0.178	38.45	-15.94
		839.0	-0.40	1 / 50	25.04	22.49	0.177	38.45	-15.96
	QPSK	834.0	-0.40	1 / 1	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 104	25.13	22.58	0.181	38.45	-15.87
		839.0	-0.40	1 / 1	25.10	22.55	0.180	38.45	-15.90
	16-QAM	834.0	-0.40	1 / 50	24.15	**21.60**	0.145	38.45	-16.85
	64-QAM	839.0	-0.40	1 / 1	23.00	**20.45**	0.111	38.45	-18.00
	256-QAM	839.0	-0.40	1 / 104	20.26	**17.71**	0.059	38.45	-20.74

Table 7-11. Antenna 3b ERP Data (NR Band n26)

NR Band n5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	π/2 BPSK	826.5	-0.40	1 / 23	25.11	**22.56**	0.180	38.45	-15.89
		836.5	-0.40	1 / 1	25.06	22.51	0.178	38.45	-15.94
		846.5	-0.40	1 / 23	25.11	22.56	0.180	38.45	-15.89
	QPSK	826.5	-0.40	1 / 12	25.16	22.61	0.182	38.45	-15.84
		836.5	-0.40	1 / 12	25.20	**22.65**	0.184	38.45	-15.80
		846.5	-0.40	1 / 23	25.18	22.63	0.183	38.45	-15.82
	16-QAM	826.5	-0.40	1 / 12	24.24	**21.69**	0.148	38.45	-16.76
	64-QAM	826.5	-0.40	1 / 23	23.25	**20.70**	0.117	38.45	-17.75
	256-QAM	846.5	-0.40	1 / 12	20.33	**17.78**	0.060	38.45	-20.67
10 MHz	π/2 BPSK	829.0	-0.40	1 / 25	25.12	22.57	0.181	38.45	-15.88
		836.5	-0.40	1 / 25	25.04	22.49	0.177	38.45	-15.96
		844.0	-0.40	1 / 25	25.19	**22.64**	0.184	38.45	-15.81
	QPSK	829.0	-0.40	1 / 1	24.79	22.24	0.167	38.45	-16.21
		836.5	-0.40	1 / 50	24.95	22.40	0.174	38.45	-16.05
		844.0	-0.40	1 / 50	25.20	**22.65**	0.184	38.45	-15.80
	16-QAM	844.0	-0.40	1 / 25	24.16	**21.61**	0.145	38.45	-16.84
	64-QAM	836.5	-0.40	1 / 1	23.01	**20.46**	0.111	38.45	-17.99
	256-QAM	844.0	-0.40	1 / 25	20.22	**17.67**	0.058	38.45	-20.78
15 MHz	π/2 BPSK	831.5	-0.40	1 / 77	25.17	**22.62**	0.183	38.45	-15.83
		836.5	-0.40	1 / 36	25.15	22.60	0.182	38.45	-15.85
		841.5	-0.40	1 / 77	24.96	22.41	0.174	38.45	-16.04
	QPSK	831.5	-0.40	1 / 77	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 77	25.07	22.52	0.179	38.45	-15.93
		841.5	-0.40	1 / 36	25.19	22.64	0.184	38.45	-15.81
	16-QAM	831.5	-0.40	1 / 36	24.20	**21.65**	0.146	38.45	-16.80
	64-QAM	831.5	-0.40	1 / 1	23.10	**20.55**	0.114	38.45	-17.90
	256-QAM	836.5	-0.40	1 / 77	20.22	**17.67**	0.058	38.45	-20.78
20 MHz	π/2 BPSK	834.0	-0.40	1 / 104	25.20	**22.65**	0.184	38.45	-15.80
		836.5	-0.40	1 / 50	25.04	22.49	0.177	38.45	-15.96
		839.0	-0.40	1 / 104	25.17	22.62	0.183	38.45	-15.83
	QPSK	834.0	-0.40	1 / 50	25.11	22.56	0.180	38.45	-15.89
		836.5	-0.40	1 / 104	25.20	**22.65**	0.184	38.45	-15.80
		839.0	-0.40	1 / 1	25.11	22.56	0.180	38.45	-15.89
	16-QAM	836.5	-0.40	1 / 1	24.25	**21.70**	0.148	38.45	-16.75
	64-QAM	834.0	-0.40	1 / 50	23.26	**20.71**	0.118	38.45	-17.74
	256-QAM	834.0	-0.40	1 / 104	20.35	**17.80**	0.060	38.45	-20.65

Table 7-12. Antenna 3b ERP Data (NR Band n5)

WCDMA Cell

Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	24.80	-0.40	22.25	0.168	38.45	-16.20
836.60	WCDMA850	24.96	-0.40	**22.41**	**0.174**	38.45	-16.04
846.60	WCDMA850	24.84	-0.40	22.29	0.169	38.45	-16.16

Table 7-13. Antenna 3b ERP Data (WCDMA Cell)

7.6 Radiated Spurious Emissions

§2.1053, 22.917(a)

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

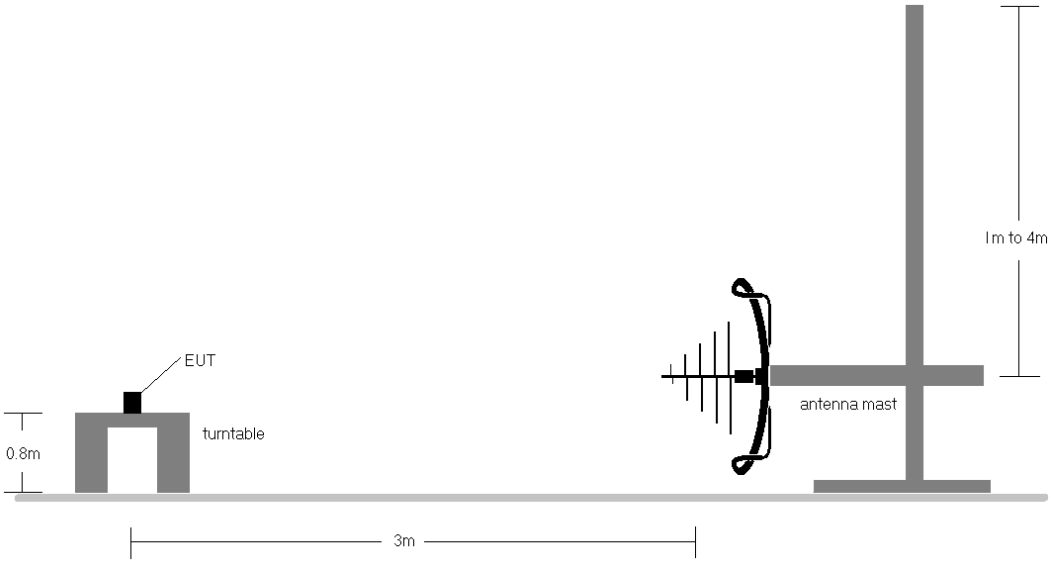


Figure 7-9. Test Instrument & Measurement Setup < 1GHz

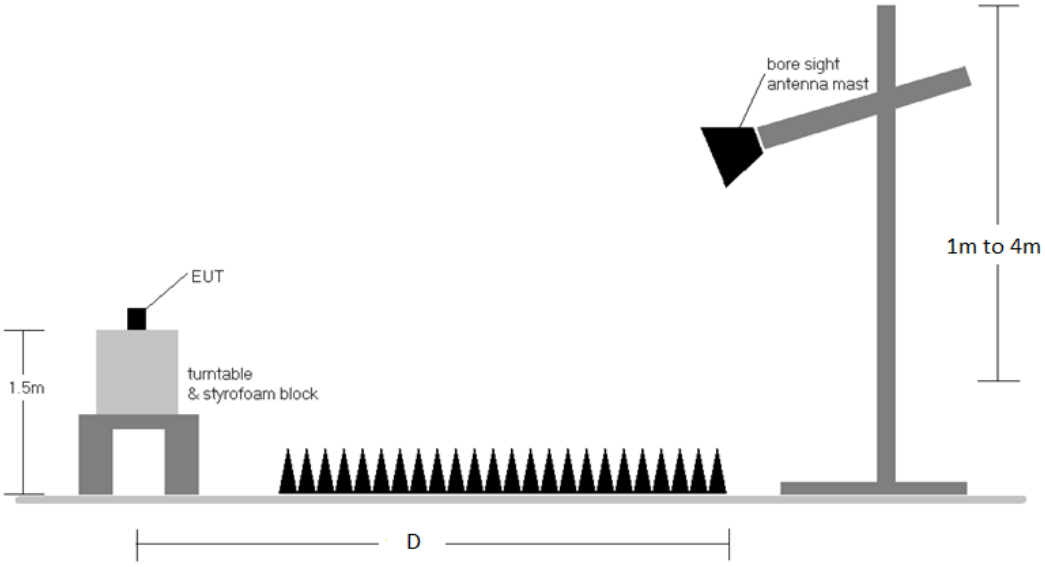


Figure 7-10. Test Instrument & Measurement Setup >1 GHz

Test Notes

1. Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
    a. E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
    b. EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2. This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to “1”.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

4. This unit was tested with its standard battery.

5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

6. D is the measurement test distance and emissions 1-18GHz were measured at a 3 meters test distance.

7. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

8. ULCA spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.

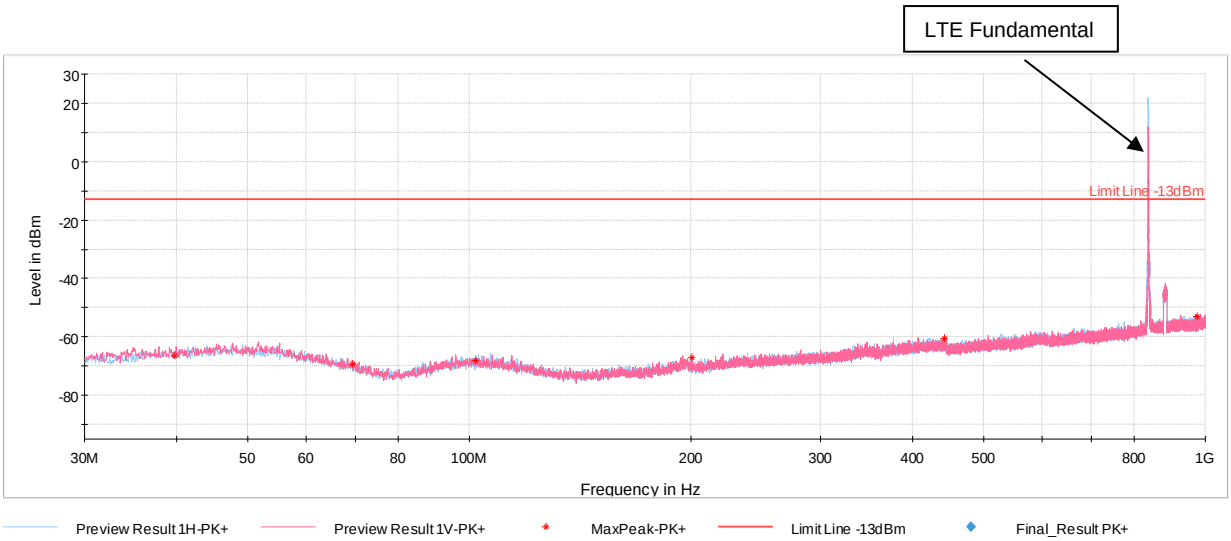
9. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

10. Spurious emission in EN-DC Operating mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor) has been checked and was found to not to be the worst case.

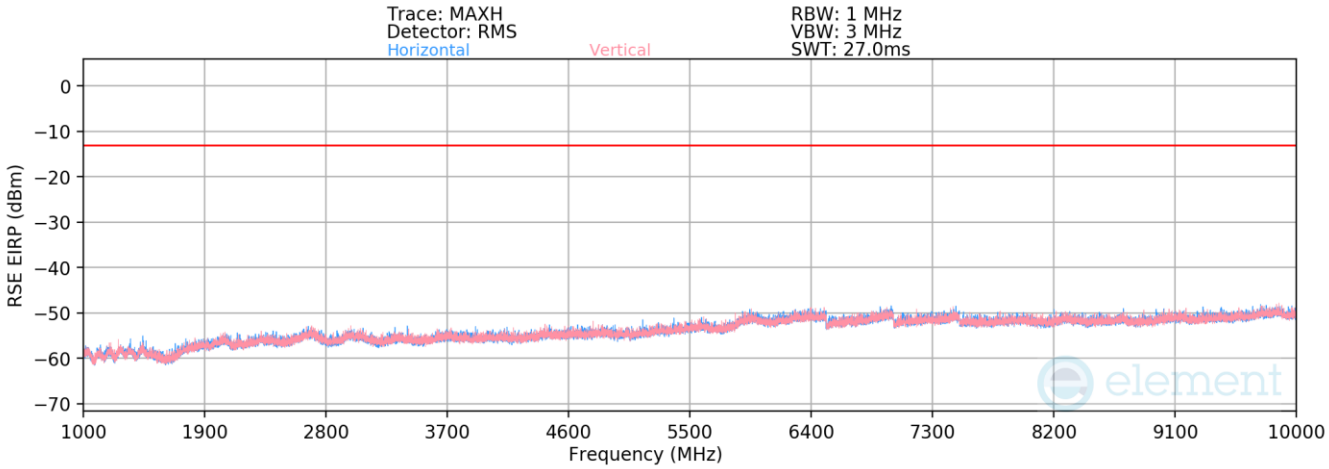
11. Uplink carrier aggregation inter-band emission was investigated and found to not be the worst case.

7.6.1 Antenna 4 – Radiated Spurious Emission Measurements

LTE Band 26/5



Plot 7-114. Antenna 4 Radiated Spurious Plot below 1GHz (LTE Band 26/5)



Plot 7-115. Antenna 4 Radiated Spurious Plot above 1GHz (LTE Band 26/5)

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-72.85	-5.12	29.03	-66.22	-13.00	-53.22
2487.0	H	-	-	-74.28	-0.18	32.55	-62.71	-13.00	-49.71
3316.0	H	-	-	-75.67	2.18	33.50	-61.76	-13.00	-48.76

Table 7-14. Antenna 4 Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-72.68	-5.12	29.20	-66.05	-13.00	-53.05
2509.5	H	-	-	-74.21	-0.18	32.62	-62.64	-13.00	-49.64
3346.0	H	-	-	-75.97	2.52	33.55	-61.71	-13.00	-48.71

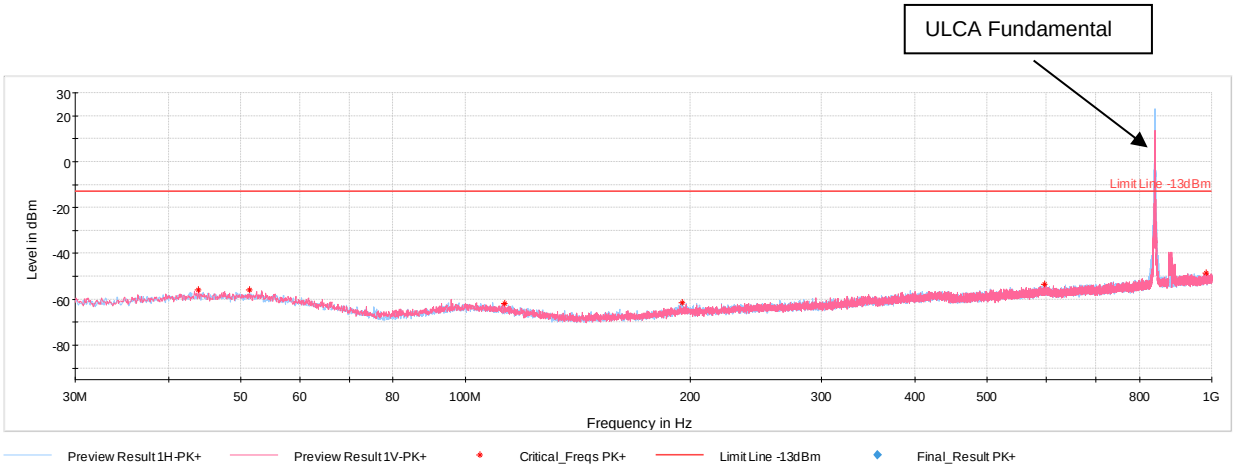
Table 7-15. Antenna 4 Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 24

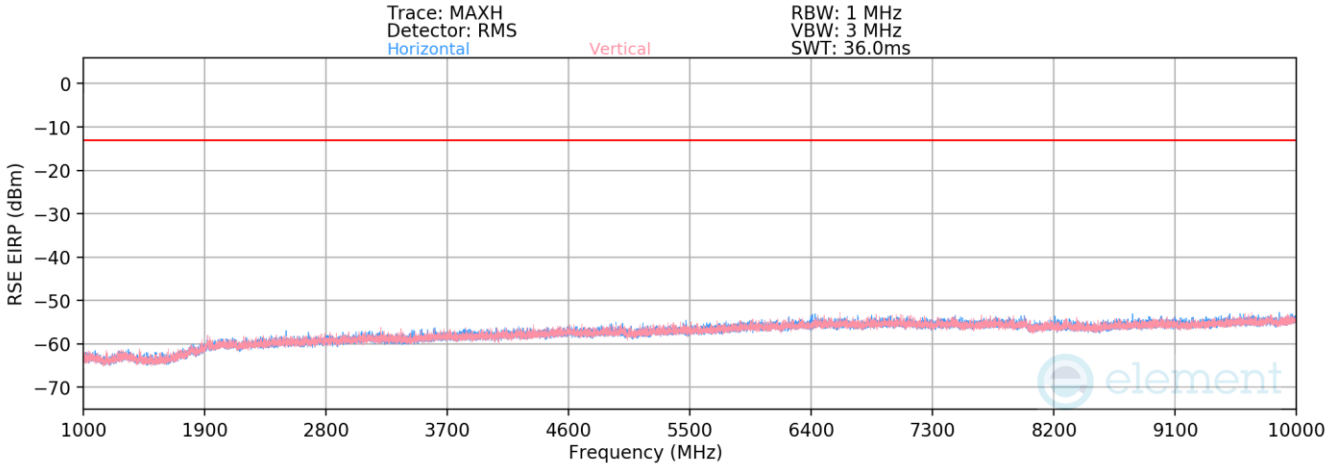
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-72.98	-5.27	28.75	-66.50	-13.00	-53.50
2532.0	H	-	-	-74.50	0.22	32.73	-62.53	-13.00	-49.53
3376.0	V	-	-	-75.80	2.27	33.47	-61.79	-13.00	-48.79

Table 7-16. Antenna 4 Radiated Spurious Data (LTE Band 26/5 – High Channel)

ULCA LTE Band 5



Plot 7-116. Antenna 4 Radiated Spurious Plot below 1GHz (ULCA LTE Band 5)



Plot 7-117. Antenna 4 Radiated Spurious Plot above 1GHz (ULCA LTE Band 5)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	829.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	838.9
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-74.83	-5.94	26.23	-69.03	-13.00	-56.03
2487.0	H	-	-	-74.89	-2.48	29.63	-65.62	-13.00	-52.62
3316.0	H	-	-	-75.75	-0.68	30.57	-64.69	-13.00	-51.69

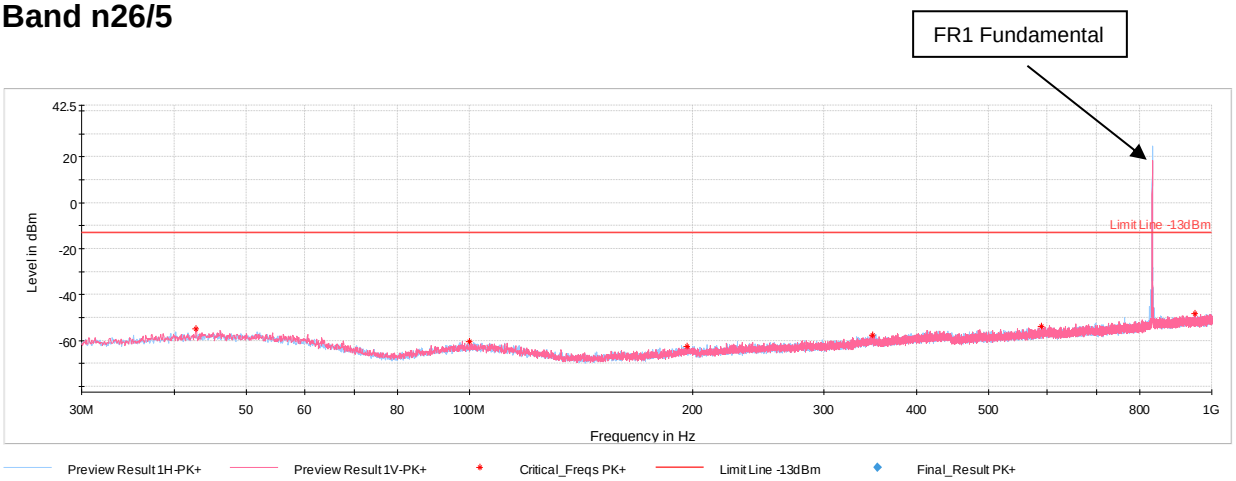
Table 7-17. Antenna 4 Radiated Spurious Data (ULCA LTE Band 5 – Low Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

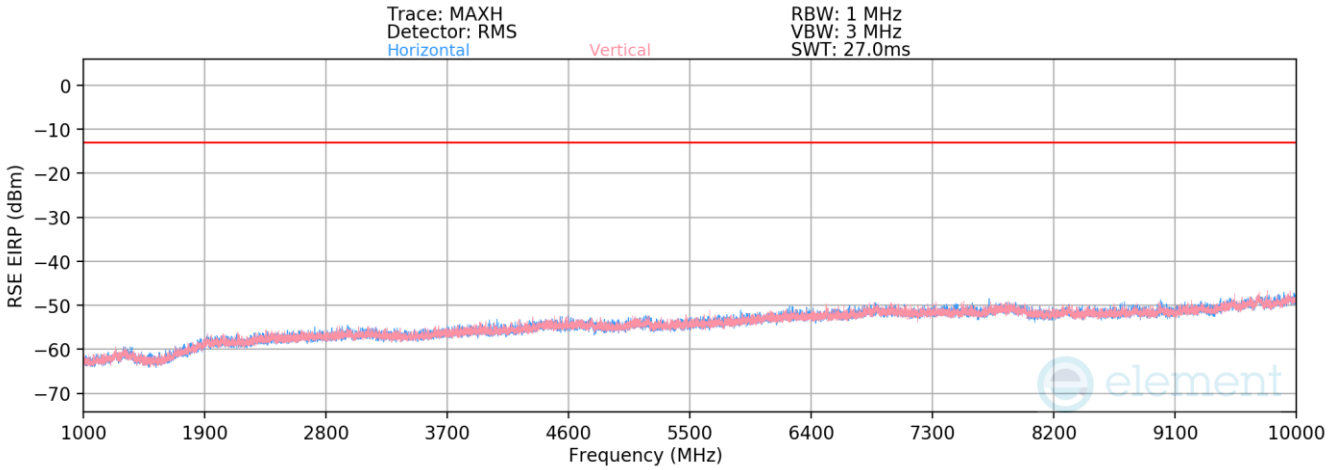
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-74.56	-6.54	25.90	-69.36	-13.00	-56.36
2532.0	H	-	-	-75.04	-2.10	29.86	-65.39	-13.00	-52.39
3376.0	H	-	-	-75.59	-0.29	31.12	-64.14	-13.00	-51.14

Table 7-18. Antenna 4 Radiated Spurious Data (ULCA LTE Band 5 – High Channel)

NR Band n26/5



Plot 7-118. Antenna 4 Radiated Spurious Plot below 1GHz (NR Band n26/5)



Plot 7-119. Antenna 4 Radiated Spurious Plot above 1GHz (NR Band n26/5)

Bandwidth (MHz):	20
Frequency (MHz):	834.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1668.0	H	-	-	-78.36	-1.99	26.65	-68.61	-13.00	-55.61
2502.0	H	-	-	-78.10	2.41	31.31	-63.95	-13.00	-50.95
3336.0	H	-	-	-79.27	4.23	31.95	-63.30	-13.00	-50.30

Table 7-19. Antenna 4 Radiated Spurious Data (NR Band n26/5 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-78.65	-1.90	26.45	-68.81	-13.00	-55.81
2509.5	H	-	-	-77.81	2.31	31.50	-63.76	-13.00	-50.76
3346.0	H	-	-	-78.89	3.89	32.00	-63.26	-13.00	-50.26

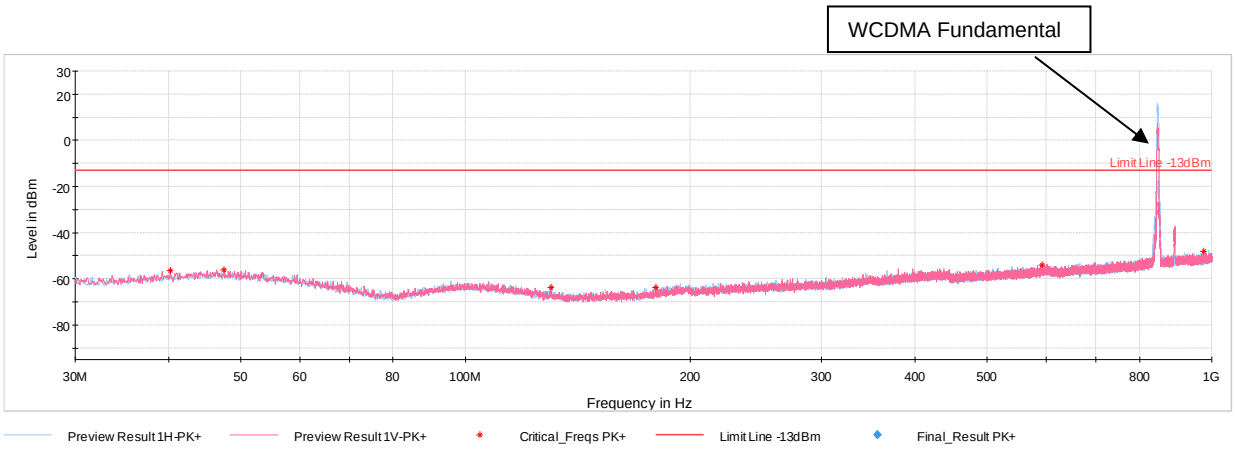
Table 7-20. Antenna 4 Radiated Spurious Data (NR Band n26/5 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50

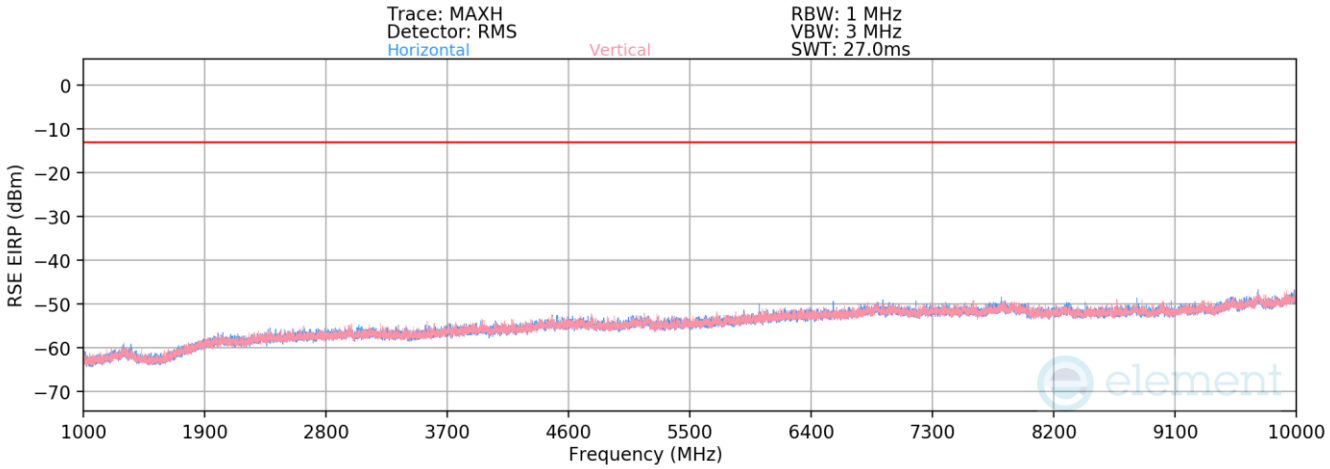
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.0	H	-	-	-78.49	-1.99	26.52	-68.74	-13.00	-55.74
2517.0	H	-	-	-78.20	2.48	31.28	-63.98	-13.00	-50.98
3356.0	H	-	-	-79.00	3.89	31.89	-63.36	-13.00	-50.36

Table 7-21. Antenna 4 Radiated Spurious Data (NR Band n26/5 – High Channel)

WCDMA Cell



Plot 7-120. Antenna 4 Radiated Spurious Plot below 1GHz (WCDMA Cell)



Plot 7-121. Antenna 4 Radiated Spurious Plot above 1GHz (WCDMA Cell)

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	H	-	-	-77.65	-1.96	27.39	-67.87	-13.00	-54.87
2479.2	H	-	-	-77.88	2.31	31.43	-63.83	-13.00	-50.83
3305.6	H	-	-	-79.10	3.94	31.84	-63.42	-13.00	-50.42

Table 7-22. Antenna 4 Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	-	-	-78.15	-1.61	27.24	-68.02	-13.00	-55.02
2509.8	H	-	-	-77.96	2.43	31.47	-63.79	-13.00	-50.79
3346.4	H	-	-	-79.27	4.23	31.96	-63.30	-13.00	-50.30

Table 7-23. Antenna 4 Radiated Spurious Data (WCDMA Cell – Mid Channel)

Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	H	216	273	-72.73	-1.34	32.93	-62.32	-13.00	-49.32
2539.8	H	-	-	-78.29	2.70	31.41	-63.85	-13.00	-50.85
3386.4	H	-	-	-78.99	3.94	31.95	-63.31	-13.00	-50.31
4233.0	H	-	-	-79.61	6.10	33.49	-61.77	-13.00	-48.77

Table 7-24. Antenna 4 Radiated Spurious Data (WCDMA Cell – High Channel)

7.6.2 Antenna 3b – Radiated Spurious Emission Measurements

LTE Band 26/5

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-73.15	-5.12	28.73	-66.52	-13.00	-53.52
2487.0	H	-	-	-74.02	-0.46	32.51	-62.75	-13.00	-49.75
3316.0	H	-	-	-76.00	2.52	33.51	-61.74	-13.00	-48.74

Table 7-25. Antenna 3b Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-73.21	-5.12	28.67	-66.58	-13.00	-53.58
2509.5	H	-	-	-74.32	-0.02	32.66	-62.60	-13.00	-49.60
3346.0	H	-	-	-76.02	2.52	33.49	-61.76	-13.00	-48.76

Table 7-26. Antenna 3b Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 24

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-73.28	-5.12	28.60	-66.65	-13.00	-53.65
2532.0	H	-	-	-74.39	0.05	32.67	-62.59	-13.00	-49.59
3376.0	H	-	-	-75.81	2.27	33.46	-61.80	-13.00	-48.80

Table 7-27. Antenna 3b Radiated Spurious Data (LTE Band 26/5 – High Channel)

ULCA LTE Band 5

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	829.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	838.9
SCC RB / Offset:	1 / 0

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-74.87	-6.11	26.02	-69.24	-13.00	-56.24
2487.0	H	-	-	-74.94	-2.34	29.71	-65.55	-13.00	-52.55
3316.0	H	-	-	-75.51	-0.63	30.86	-64.40	-13.00	-51.40

Table 7-28. Antenna 3b Radiated Spurious Data (ULCA LTE Band 5 – Low Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-75.15	-5.94	25.91	-69.34	-13.00	-56.34
2532.0	H	-	-	-74.99	-2.38	29.63	-65.62	-13.00	-52.62
3376.0	H	-	-	-75.29	-0.68	31.03	-64.23	-13.00	-51.23

Table 7-29. Antenna 3b Radiated Spurious Data (ULCA LTE Band 5 – High Channel)

NR Band n26/5

Bandwidth (MHz):	20
Frequency (MHz):	834.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1668.0	H	-	-	-78.29	-1.90	26.81	-68.45	-13.00	-55.45
2502.0	H	-	-	-77.91	2.31	31.40	-63.86	-13.00	-50.86
3336.0	H	-	-	-78.44	3.89	32.45	-62.81	-13.00	-49.81

Table 7-30. Antenna 3b Radiated Spurious Data (NR Band n26/5 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-78.52	-1.99	26.49	-68.77	-13.00	-55.77
2509.5	H	-	-	-78.10	2.31	31.21	-64.04	-13.00	-51.04
3346.0	H	-	-	-78.98	3.89	31.91	-63.35	-13.00	-50.35

Table 7-31. Antenna 3b Radiated Spurious Data (NR Band n26/5 – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.0	H	-	-	-78.49	-1.90	26.61	-68.65	-13.00	-55.65
2517.0	H	-	-	-78.05	2.41	31.36	-63.90	-13.00	-50.90
3356.0	H	-	-	-78.81	3.89	32.08	-63.18	-13.00	-50.18

Table 7-32. Antenna 3b Radiated Spurious Data (NR Band n26/5 – High Channel)

WCDMA Cell

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	H	-	-	-77.80	-1.96	27.24	-68.02	-13.00	-55.02
2479.2	H	-	-	-78.18	2.31	31.13	-64.13	-13.00	-51.13
3305.6	H	-	-	-79.05	3.94	31.89	-63.37	-13.00	-50.37

Table 7-33. Antenna 3b Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	-	-	-77.74	-1.61	27.65	-67.61	-13.00	-54.61
2509.8	H	-	-	-78.24	2.43	31.19	-64.07	-13.00	-51.07
3346.4	H	-	-	-79.03	4.23	32.20	-63.06	-13.00	-50.06

Table 7-34. Antenna 3b Radiated Spurious Data (WCDMA Cell – Mid Channel)

Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	H	198	30	-73.89	-1.34	31.77	-63.48	-13.00	-50.48
2539.8	H	-	-	-78.35	2.70	31.35	-63.91	-13.00	-50.91
3386.4	H	-	-	-78.90	3.94	32.04	-63.22	-13.00	-50.22
4233.0	H	-	-	-79.42	6.10	33.68	-61.58	-13.00	-48.58

Table 7-35. Antenna 3b Radiated Spurious Data (WCDMA Cell – High Channel)

7.7 Frequency Stability / Temperature Variation

§2.1055, 22.355

Test Overview and Limit

Frequency Tolerance testing is performed in accordance with the guidelines of ANSI C63.26-2015 and TIA-603-E-2016. All port were tested and only the worst case data were reported. The Frequency Tolerance of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the Frequency Tolerance of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26-2015

TIA-603-E-2016

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

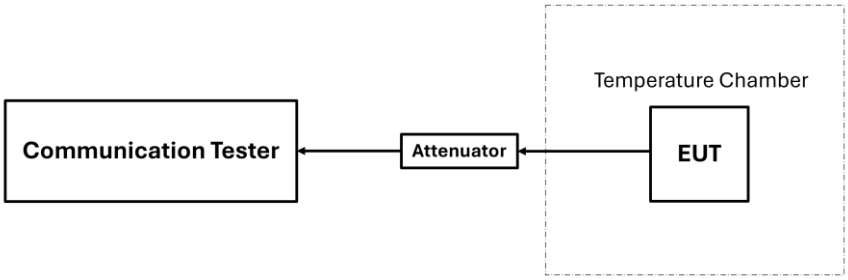


Figure 7-11. LTE Test Instrument & Measurement Setup

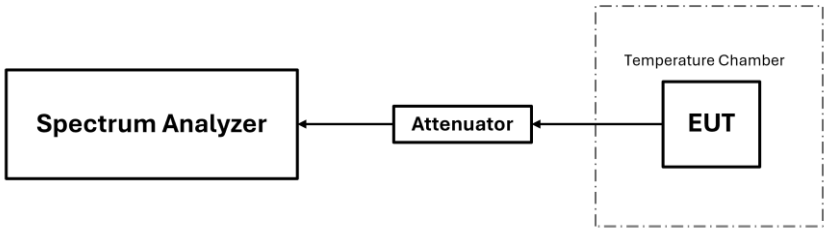


Figure 7-12. FR1 Test Instrument & Measurement Setup

Test Notes

1. All port were tested and only the worst case data were reported.

Frequency Tolerance / Temperature Variation

LTE Band 26/5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.80
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,499,908	-126.00	-0.0000151
		- 20	836,499,948	-86.00	-0.0000103
		- 10	836,499,942	-92.00	-0.0000110
		0	836,499,985	-49.00	-0.0000059
		+ 10	836,499,906	-128.00	-0.0000153
		+ 20 (Ref)	836,500,034	0.00	0.0000000
		+ 30	836,500,089	55.00	0.0000066
		+ 40	836,499,980	-54.00	-0.0000065
		+ 50	836,500,136	102.00	0.0000122
Battery Endpoint	3.40	+ 20	836,499,979	-55.00	-0.0000066

Table 7-36. LTE Band 26/5 Frequency Tolerance Data

Frequency Tolerance / Temperature Variation

NR Band n26/5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	3.80
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,500,156	156.00	0.0000186
		- 20	836,500,095	95.00	0.0000114
		- 10	836,500,162	162.00	0.0000194
		0	836,500,052	52.00	0.0000062
		+ 10	836,500,096	96.00	0.0000115
		+ 20 (Ref)	836,500,000	0.00	0.0000000
		+ 30	836,499,937	-63.00	-0.0000075
		+ 40	836,500,052	52.00	0.0000062
		+ 50	836,499,904	-96.00	-0.0000115
Battery Endpoint	3.40	+ 20	836,499,880	-120.00	-0.0000143

Table 7-37. NR Band n26/n5 Frequency Tolerance Data

Frequency Tolerance / Temperature Variation

WCDMA Cellular	
Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	3.80
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,599,947	-53.00	-0.0000063
		- 20	836,599,871	-129.00	-0.0000154
		- 10	836,599,954	-46.00	-0.0000055
		0	836,600,045	45.00	0.0000054
		+ 10	836,600,035	35.00	0.0000042
		+ 20 (Ref)	836,600,000	0.00	0.0000000
		+ 30	836,599,942	-58.00	-0.0000069
		+ 40	836,599,872	-128.00	-0.0000153
		+ 50	836,599,842	-158.00	-0.0000189
Battery Endpoint	3.40	+ 20	836,600,048	48.00	0.0000057

Table 7-38. WCDMA Cell Frequency Tolerance Data

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Apple **Tablet Device FCC ID: BCGA3267** complies with all the requirements of Part 22 of the FCC rules.